Medical Compend

FOR COMMANDERS OF NAVAL VESSELS

1944

NAVMED 124

MEDICAL COMPEND

For

Commanding Officers of Naval Vessels to Which no Member of the Medical Department of the United States Navy Is Attached

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To Accompany Medicine Box

PUBLISHED BY THE

U.S. BUREAU OF MEDICINE AND SURGERY

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BUREAU OF MEDICINE AND SURGERY,
NAVY DEPARTMENT,
Washington, D. C., July 1, 1941.

This MEDICAL COMPEND for commanding officers of naval vessels to which no member of the Medical Department of the United States Navy is attached, is published for their aid in the knowledge and use of the contents of the Medicine Box, United States Navy, as well as to be a general guide in the preservation of the health of the personnel under their command.

ROSS T MCINTIRE,
Surgeon General, United States Navy.

Chapter I

MEDICAL SUPPLIES

Introduction

This Medical Compend, which accompanies the medical units, is published primarily for the use of commanding officers of naval vessels to which no representative of the medical department is attached. In its preparation, an endeavor has been made to cover, in nontechnical language, the recognition and emergency treatment of those injuries and diseases commonly met with on board ship, as well as to provide directions for the management of quarantinable diseases and those cases beyond the ability of the ship's force to handle.

It is not intended that use of these instructions shall replace the services of a medical officer or civilian doctor whenever one can be contacted, nor take the place of hospitalization whenever or wherever such facilities are available. On the contrary, it is desired that commanding officers of naval vessels to which no member of the medical department of the Navy is attached, consult freely with medical and dental officers of the Navy, whenever opportunity offers, both ashore and afloat, regarding the care and treatment of the sick, as well as the general health of the crew and the sanitation of the ship. The medical and dental officer of a yard or station will be found at the dispensary, where, with the approval of the commandant, assistance and advice in the treatment and care of the sick may be received.

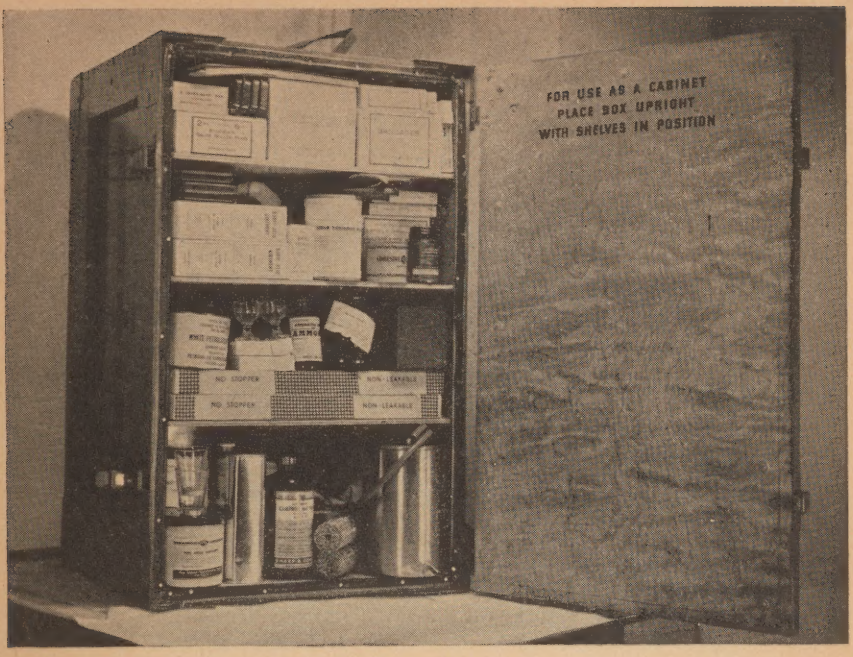
So far as possible the treatment outlined in this compend has been restricted to the employment of those agencies supplied in the medical units or which may be obtained in the customary ship's stores. Suggestions as to any special agencies which are mandatory, and which should be obtained ashore at the earliest opportunity, are so indicated.

In addition to first-aid measures and the treatment of special diseases, there have been included chapters on hospitalization, preventive medicine, personal hygiene, quarantine and bills of health, and the disinfection and fumigation of ships, as well as the action to be taken in cases of death which may occur on board. At the end of the volume is a glossary containing some of the terms used in the text which will aid in interpreting the instructions given.

The outfits of medicines and medical supplies likely to be furnished consist, as listed, of either (*a*) the *Medicine Box,* (*b*) the *Medical Boat*

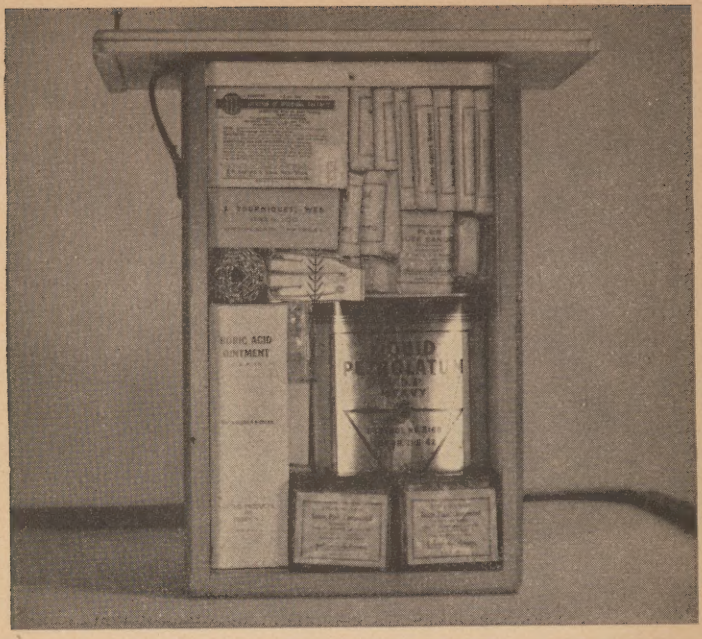
Box, (*c*) the *First-Aid Case* (*armed guard*), and (*d*) the *First-Aid Kit* (*gas casualties*), Navy standard.

Medical stores should be obtained in advance of actual need. Certain types of small vessels rarely require medical stores other than those listed. It is intended that such vessels will be furnished necessary medical treatment and stores by the shore station, base, tender, or larger vessel with which contact is had. During periods in transit or on detached service, such vessels may obtain medical stores from any naval Medical Department activity, in the following order of preference: (1) Shore stations or bases regularly supplying similar vessels; (2) any shore station or base; (3) any naval medical supply depot or storehouse; (4) other ships. Activities receiving such requests are directed to issue such essential medical stores as may be so requested. Shore activities located at ports where such vessels frequently call shall be prepared to render this service. Financial reports will *not* be submitted by vessel not having an allotment.



Medicine Box, United States Navy. Illustration shows stowage of contents. Shelves are detachable.

Medicine Box, United States Navy. Container and contents shown.



Medical Boat Box, United States Navy. Illustration shows stowage of contents.

Medical Boat Box, United States Navy. Container and contents shown.

First-Aid Case (Armed Guard), United States Navy. Illustration shows stowage of contents.

First-Aid Case (Armed Guard), United State Navy. Container and contents shown.

First-Aid Kit (Gas casualties), United States Navy. Container and contents shown.

First-Aid Kit (Gas casualties), United States Navy. Illustration shows stowage of contents.

Contents of Medical Units

The Medicine Box

Case, Tablets, U. S. N., consisting of:		
Alkaline and aromatic (Seiler)	vial	1
Aspirin, 5-gr (Acetylsalicylic Acid)	vial	1
Azochloramid, saline mixture tablets	vial	1
Bismuth Subnitrate (powdered)	vial	1
Borax (powdered)	vial	1
Brown Mixture, 1-dr (Opium and Glycyrrhiza)	vial	1
Calomel, ½-gr	vial	1
Cascara Sagrada, 4-gr	vial	1
Dover's Powder, 5-gr	vial	1
Phenacetin, 5-gr	vial	1
Phenobarbital, 1½-gr	vial	1
Quinine Sulfate, 3-gr	vial	1
Soda Bicarbonate, 10-gr	vial	1
Sodium Salicylate, 5-gr	vial	1
Case, Tablets, U. S. N., empty	one	1

(Medicines, Dressings, Etc.)

Adhesive Plaster, 2-in. by 5-yd	spool	1
APC Tablets	100 bot	1
Applicator, wood	500 in bundle	1/10
Azochloramid, saline mixture, 0.5508-gm	100 bot	1
Bag, combination, hot water or ice	one	1
Bandage, gauze, 1-in	doz	1
Bandage, gauze, 2-in	doz	2
Bandaze, gauze, 3-in	doz	1
Bandage, suspensory	one	2
Basin, dressing	one	1
Castor Oil	1-qt tin	1
Catheter, soft rubber, No. 12 F	one	1
Cotton, absorbent	1-lb roll	1
Dental Analgesic, local (Toothache drops)	1-oz bot	1
Magnesium Sulfate (Epsom Salts)	2½-lb pkg	1
Eye Bath	one	2
First Aid Packet (with sulfanilamide)	one	6
Forceps, dressing	one	1
Forceps, hemostatic, straight, 5½-in. (Kelly)	one	2
Gauze, plain	25-yd roll	1
Tincture of Iodine, Mild, 10-cc applicator vial	3 in pkg	2
Irrigator	one	1
Medicine Glass	one	1
Morphine Tartrate, 0.032-gm, 1½-cc tube with sterile needle	syrette	10
Muslin	yard	5
Ointment, Boric Acid	4-oz tube	5
Ointment, Sulfur	1-lb jar	1
Ointment, Yellow Oxide of Mercury	1-dr tube	3
Ointment, Zinc Oxide	1-lb jar	1
Pins, assorted	paper	1
Pins, safety, large	doz	1

The Medicine Box—*Continued*

(Medicines, Dressings, Etc.)—Continued

Pins, safety, medium	doz		1
Prophylactic Tubes	tube		100
Shears, 6-in	one		1
Shut-Off, spring type	one		1
Silver Protein, Mild, 0.299-gm (tablet)	100	bot	1
Silver Protein, Strong, 0.150-gm (tablet)	100	bot	1
Soap Liniment	1-pt	bot	1
Soda Bicarbonate (powder)	1-lb	ctn	1
Spirit of Ammonia, aromatic	¼-lb	bot	1
Sulfanilamide, powdered, 5-gm. packet	25 in	pkg	4
Sulfathiazole, 0.5-gm (tablet)	100	bot	1
Suture, surgical gut, untreated, No. 2, threaded in needle	tube		6
Suture, surgical gut, mild treatment No. 2 threaded in needle	tube		6
Syringe, p., pipette	one		2
Thermometer, clinical	one		2
Tongue Depressor, wood	500 in	pkg	1/10
Tourniquet, Web	one		2
Tube, glass, window (for irrigator rubber tubing)	one		2
Tube, rectal	one		1
Tubing, rubber, ¼-in	12-ft	length	½
Petrolatum, White, Vaseline	1-lb	can	1
Wire Mesh (for splints)	3-ft	piece	3
Case, empty, 30- by 19- by 17-in	one		1
Medical Compend	book		1

The Medical Boat Box

Morphine Tartrate, 0.032-gm, 1½-cc tube with sterile needle	syrette		10
Petrolatum, liquid	1-qt	tin	2
Spirit of Ammonia, aromatic, tube and paper cup	4 in	pkg	1
Acetylsalicylic Acid, 0.324-gm. (Aspirin) (tablet)	100 in	bot	1
Extract of Cascara Sagrada, 0.259-gm. (tablet)	100 in	bot	1
Tincture of Iodine, Mild, 10-cc applicator vial	3 in	pkg	1
Bandage Compress, 2-in, camouflaged	4 in	pkg	2
Bandage Compress, 4-in, camouflaged	1 in	pkg	1
Bandage, gauze, compressed, 1-in., camouflaged	one		6
Bandage, gauze, compressed 2-in., camouflaged	one		6
Bandage, gauze, compressed, 3-in., camouflaged	one		6
Bandage, triangular, compressed, camouflaged	one		2
Cotton absorbent, compressed	1-oz	pkg	4
Gauze, plain, compressed	1-oz	pkg	6
Pins, safety, large	doz		1
Splint, wire mesh for, 5- by 36-in	piece		1
Tourniquet, Web, camouflaged	pkg		1
Ointment, Boric Acid	4-oz	tube	3
Sulfadiazine, 24 1-gm tablets in package	pkg		2
Sulfanilamide, powdered, 5-gm packet	25 in	pkg	1
Sodium Bicarbonate, 0.648-gm (tablet)	100	bot	1
Box, boat, empty	one		1

The First Aid Case (Armed Guard)

(Medicines, Dressings, Etc.)—Continued

Magnesium Sulfate (Epsom Salt)	pkg	1
Morphine Tartrate, 0.032-gm, 1½-cc tube with sterile needle	syrette	20
Ointment, Mercurous Chloride, Mild, compound	tube	50
Ointment, Yellow Mercuric Oxide, 1%	1-dr tube	5
Petrolatum, White (Vaseline)	1-lb. can	1
Sodium Bicarbonate (powder)	1-lb. ctn	1
Spirt of Ammonia, aromatic	¼-lb. bot	1
Acid, Acetylsalicylic, 0.324-gm (tablet)	100 bot	2
Alkaline and Aromatic (Seiler) (tablet)	100 bot	1
Extract of Cascara Sagrada, 0.259-gm (tablet)	100 bot	1
Opium and Glycyrrhiza Compound, 3.7-cc (tablet)	1,000 bot	1
Tincture of Iodine, Mild, 10-cc applicator vial	3 in pkg	3
Applicator, wood	500 in bundle	25/500
Bandage, gauze, 1-in	doz	1
Bandage, gauze, 2-in	doz	2
Bandaze, gauze, 3-in	doz	1
Bandage, triangular, compressed	one	2
Bath, eye	one	1
Case, Pins, Scissors and Dressing Forceps	one	1
Cotton, absorbent, compressed	1-oz pkg	6
Dressing, battle, large	one	6
Dressing, battle, small	one	18
Dressing, head, adjustable, compressed	one	4
Gauze, plain, compressed	1-oz pkg	18
Medicine Glass	one	1
Plaster, adhesive, 2-in. by 5-yd	spool	2
Shade, eye, single	one	2
Spectacles, smoked glass	one	3
Splint, basswood for, 18- by 3¼-in	12 in set	1
Syringe, p., pipette, with rubber bulb, ⅛-oz capacity	one	2
Thermometer, clinical	one	2
Tourniquet, braided line (Spanish windlass type)	one	4
Tongue Depressors, wood	500 in bundle	25/500
Pencil, indelible	one	1
Dental Analgesic, local (Toothache drops, NF)	1-oz bot	1
Suture, surgical gut, boilable No. 2, threaded in needle	tube	6
Tag, Medical Emergency	25 in pkg	1
Suitcase, hard fiber, 30- by 12- by 11-in	one	1
Alcohol	200-cc. bot	1
Benzedrine Inhaler	one	4
Boric Acid Solution, 4%	200-cc. bot	1
Detergent Emulsion	1-pt. bot	1
Ointment, Boric Acid	4-oz. tube	6
Sulfanilamide, powdered (for topical application) 5-gm packet	25 in pkg	2
APC Tablets	100 bot	1
Atabrine, 0.1-gm (tablet)	100 bot	1
Silver Protein, Mild, 0.299-gm (tablet)	100 in bot	1
Silver Protein, Strong, 0.150-gm (tablet)	100 bot	1
Sodium Bicarbonate, 0.648-gm (tablet)	100 bot	2
Sulfathiazole, 0.5-gm (tablet)	100 bot	2

First Aid Kit (Gas Casualties)

(Medicines, Dressings, Etc.)—Continued

Forceps, hemostatic, straight, 5-in. (Jones)	one	1
Pencil, dermatographic, double end blue and red. (skin marking)	one	1
Litter, canvas, complete with splints and straps	one	1
Insecticide, powder (for body lice)	2-oz pkg	2
Medical Compend (book)	one	1
Prevent Venereal Disease (leaflet)	one	15
Venereal Prophylaxis Instructions (leaflet)	one	1

First Aid Kit (Gas Casualties)

Amyl Nitrate, 5 minim pearl	12 in box	1
Copper Sulfate Solution, 10%, 2¼-oz with Blunt Dressing Forceps	pkg	1
Ointment, Anesthetic	1-oz tube	1
Ointment, BAL	½-oz tube	1
Ointment, Butyn Ophthalmic, 2%	1-dr tube	2
Ointment, Protective, S-330	3-oz tube	2
Ointment, Protective, S-461	3-oz tube	2
Cotton Pads, 1- by 2-in	50 in pkg	1

Directions for Use of Important Medical Supplies

Medicines

Alkaline and Aromatic *(Seiler)* (tablet). A mild, soothing antiseptic; for sore throat and rhinitis.

Dose.—Dissolve two tablets in half a glass of warm water, and use as gargle or nasal douche every 3 to 4 hours.

Argyrol (Silver protein, mild). A mild antiseptic; for use in inflammations of the eyes and as a preventive and treatment of gonorrhea (clap). Prepare a 10-percent solution by sprinkling one part of the crystals on the surface of 10 parts of boiled, distilled water, or ten tablets to one ounce of water; later, agitate until completely dissolved.

Warning.—Solutions should be prepared only in small amounts as needed and should not be used after standing more than 1 or 2 days, as the drug tends to deteriorate rapidly in solution. Stains may be removed with bichloride solution.

Aspirin (Acetylsalicylic acid) (5-grain tablet). An anodyne and analgesic; for headache, neuralgia, rheumatism, colds and fever. May also be used as a gargle in painful sore throat.

Dose.—For headache: One tablet, preferably followed by a half teaspoonful of sodium bicarbonate (baking soda), repeated in 1 hour if necessary. For sore throat: One tablet dissolved in one-fourth glass of warm water.

Atabrine. Used in the prevention and treatment of malaria. Antabrine is a yellow bitter powder supplied in the form of 0.1-gram tablets. When operating in known malarious areas it is essential that all men take Atabrine regularly to prevent the development of the symptoms of malaria. This is known as suppressive or preventive therapy.

Dose (suppressive schedule).—One tablet each day for 6 days.

Dose (treatment schedule).—Use schedule on page 79.

Warning.—The skin of many patients taking Atabrine turns slightly yellow. This is not serious and should not be mistaken for jaundice. If taken before meals Atabrine may produce nausea and vomiting.

Azochloramid Saline Mixture Tablets. A mild antiseptic for the treatment of infected wounds and burns. To prepare, place one tablet in 2 ounces of water, crush and stir. Infected wounds may be soaked in Azochloramid solution or covered with gauze dressings moistened with the solution. Do not use this solution in the eyes, mouth, or nose.

Bismuth Subnitrate (powder). An astringent; for diarrhea. Should be mixed with equal parts of sodium bicarbonate (baking soda).

Dose.—One-half teaspoonful of mixture in water every 2 hours until relieved. Usually 10 doses or less are sufficient.

Borax (powder). A mild antiseptic and astringent; to be used in making eye lotion.

Dose.—(See under Eye, diseases of).

Brown Mixture (Opium and Glycyrrhiza tablets) (1-dram tablet). An expectorant; for coughs and bronchitis.

Dose.—One tablet dissolved in the mouth every hour.

Warning.—Limit, 20 tablets in 24 hours.

Caffeine (coffee and tea). Stimulantes the brain, breathing and the circulation (heart and blood vessels); useful in the treatment of collapse or shock resulting from injuries. Coffee and tea contain the drug and are of value not only because

of the Caffeine, but also because of the increased body warmth resulting from the administration of hot liquids.

Dose.—Six to eight ounces in cup.

Warning.—Coffee or tea should *not be hot enough to burn* when given.

CALOMEL (½-grain tablet). A cholagogue and cathartic; used for constipation and biliousness; also in some fevers.

Dose.—One tablet every hour until five are taken. Should be followed in a few hours or the next morning by a dose of Epsom salt (magnesium sulfate), one tablespoonful dissolved in a small quantity of hot water.

Warning.—Do not give a cathartic or laxative to a patient with abdominal or stomach pain. If the pain is caused by appendicitis the drug might cause the appendix to burst.

CASCARA SAGRADA (4-grain tablet). A mild laxative; preferable for chronic constipation.

Dose.—One or two tablets at bedtime.

CASTOR OIL (cathartic). Useful for emptying the bowel in beginning diarrhea.

Dose.—One to two tablespoonfuls. First wet the mouth with a hot liquid (milk, coffee, or tea), then take the oil and follow with some more of the liquid.

DENTALONE (solution). Analgesic for toothache. Apply in cavity on small pellets of cotton after first touched to another piece of cotton to remove excess fluid, and after cavity has been cleaned out and dried.

EPSOM SALT (magnesium sulfate, crystals). A quick acting cathartic; for constipation.

Dose.—One to two tablespoonfuls, preferably dissolved in a small quantity of hot water. Should be taken on an empty stomach. Excellent also as a wet dressing and hot soak in the treatment of infected wounds. (25 percent solution is used for inflamed areas and wounds).

FORMALDEHYDE SOLUTION **(Poison).** Disinfectant; for use as disinfectant only. Should be kept well stoppered and in a cool place. Two tablespoonfuls of this solution to 1 quart of water serves as an excellent disinfectant for knives, forks, cups, etc. (See Disinfectants).

Warning.—The escaping vapor is very irritating to the eyes, nostrils, and lungs.

IODINE, TINCTURE **(Poison).** (mild tincture, in applicator vials). Antiseptic for minor wounds. Unscrew cap of vial and apply according to instructions or swab out wound with moistened cotton applicator. Use lightly and only once.

Warning.—Applied to skin may cause blisters especially when covered by a dressing. Never use iodine on wet skin or in connection with bichloride of mercury.

MINERAL OIL *(Petrolcum, liquid).* A lubricant; used externally in the treatment of burns of the body and eyes, and treatment of immersion foot. It is also used to remove fuel oil from the skin. Given internally, mineral oil relieves constipation.

Dose.—One tablespoonful on empty stomach before retiring.

MORPHINE SYRETTE (Morphine Tartrate, ½-grain). A narcotic which acts upon the brain and nervous system and thus relieves severe pain; of great value in treating shock resulting from severe injuries. Prepared in handy form for emergency use.

Dose.—One syrette.

Directions for use of morphine syrette:

1. Use only to relieve pain.

2. Usually the outer surface of the upper arm is the site selected for the injection as it is convenient and the skin is less sensitive. However, the needle may be injected into the thighs if the arms are burned or injured.
3. Give patient one injection of morphine. If pain recurs, a second syrette may be given 4 hours or more after the first.
4. Do not give morphine if breathing is slow, 12 per minute or less.
5. Keep a record of each dose, noting the time given. If patient is to be moved, note dose and time on tag tied to patient's wrist.

Technique of administration:

1. Remove transparent hood from the needle.
2. Grasp wire loop and push wire in to pierce inner seal.
3. Pull out and discard wire.
4. Thrust needle through the skin at least half its length.
5. Inject the morphine solution by slowly squeezing the syrette from the sealed end.

Warning.—Morphine is a habit forming drug. Do not give repeated regular injections of this drug to the same patient. In general one or two injections are all that should be given. Care should be taken to prevent loss or theft of the morphine syrettes.

Ointment, Boric Acid (tube). For dressing minor wounds, chafing, and for protecting the skin. Apply and then bandage.

Ointment, Sulphur (jar). For itch and ringworm. Rub on affected part thoroughly. (See Itch, treatment of).

Ointment Yellow Oxide of Mercury (tube). For styes and other inflammations of the eyes and lids. Pull down the lower lid and place the uncovered opening of the tube just above the everted lid. Press out a small portion of the ointment and close the lid. Movement of the eye will spread the ointment over the inflamed eye and lids. Do not use this ointment with Argyrol.

Ointment, Zinc Oxide (jar). For eczema, sunburn, cold sores, etc. Apply locally and bandage.

Phenacetin (5-grain tablet). An analgesic and antipyretic; for headache, neuralgia, and fever.

Dose.—One tablet with a glass of water, repeated in 1 hour if necessary.

Phenobarbital (1½-grain tablet). A sedative and hypnotic; for producing sleep and quieting restlessness.

Dose.—One tablet with a warm drink a half hour before bedtime, may be repeated with caution.

Warning.—Limit, five tablets in 24 hours. An occasional individual is allergic to this drug. In such cases, patients may develop skin rash, high fever and mental confusion.

Prophylactic Tubes. For venereal prophylaxis. To be used in accordance with accompanying instructions.

Protargol (Silver protein, strong) (0.150-gram tablet). An antiseptic; in 1 percent solution used as injection into the urethra as a preventive and treatment of gonorrhea (clap). For use, dissolve 3 tablets in pint of *distilled* water. The solution should be freshly prepared, made in small quantities as needed, and kept in amber-colored bottles.

Warning.—More irritating than Argyrol. *Do not use in eyes.*

QUININE SULFATE (3-grain tablet). Antimalarial; for suppression and treatment of malarial fevers.

Dose (suppressive—if Atabrine not available).—3 tablets (9 grains) daily.

Dose (treatment schedule).—5 tablets (15 grains) three times daily for 2 days followed by 3 tablets (9 grains) three times daily for the following 5 days. Repeat if fever returns.

Warning.—Limit, 12 tablets in 24 hours. An occasional individual is allergic to this drug. In such cases, patients may develop itching and skin rash, ringing in the ears, nausea, and vomiting. Administration of the drug should be discontinued on the first appearance of any of these symptoms.

SALT (Sodium Chloride—common table salt). A chemical required by the body to maintain healthy function. Externally a mild antiseptic. Used in the prevention and treatment of heat cramps and heat exhaustion. With baking soda or alone, dissolved in water makes a soothing alkaline gargle.

Dose (for heat cramps).—Five-grain tablet (or ⅛ teaspoonful) in 6 ounces of water; (for gargle or wet dressing).—¼ to ½ teaspoonful in 8 ounces of water.

SOAP LINIMENT. Use with massage for lumbago, painful muscles, sprains, etc.

Warning.—External use only.

SODIUM BICARBONATE (baking soda). Antacid; for indigestion and heartburn. Also for use with Bismuth Subnitrate (see above), and for preparing eye wash (see Eye, diseases of).

Dose.—Two tablets or 1 teaspoonful dissolved in one-half glass of water for mild cases of indigestion. A paste or solution of baking soda relieves the itching caused by poison ivy, hives and insect bites.

SODIUM SALICYLATE (5-grain tablet). Analgesic and antirheumatic; for rheumatism and rheumatic pains.

Dose.—Two tablets every 4 hours.

Warning.—Limit, 12 tablets in 24 hours. Watch for symptoms of drug intoxication, such as ringing in the ears, nausea, vomiting, and deafness. Administration of the drug should be discontinued on the first appearance of symptoms.

SPIRIT OF AMMONIA, AROMATIC (bottle). Antacid and diffusible stimulant; for faintness, shock and relief of nausea.

Dose.—By mouth; one-half teaspoonful well diluted with water; by inhalation: from saturated gauze or handkerchief.

SULFADIAZINE *(1-gram tablet).* A chemical substance which, when SWALLOWED, destroys or prevents the growth of certain bacteria in the body. These tablets are given ONLY to persons having open wounds of the flesh, bones, brain, etc.

Dose.—Four tablets by mouth—at once. Water can be given to help swallowing. After the initial dose of 4 tablets, if delay is experienced in getting patient to a doctor, give 1 tablet (*AND ONLY 1*) every 6 hours.

Warning.—Do not give these tablets any longer than 2 days.

SULFANILAMIDE (Sterile powder in 5-gram package). A special antiseptic for severe wounds of muscle, bone, brain, chest, and abdominal organs.

Dose.—Dust the powder evenly into the deep recesses of and over entire wound (or wounds).

Warning.—Do not apply powder too thickly. Do not give by mouth. Do not use in connection with iodine or any other chemical substance.

VASELINE (Petrolatum white) (tin). Protective ointment and lubricant. Apply locally for burns, sunburn, chapped hands, etc., and as a substitute for mineral oil in treating immersion foot. May be used as a lubricant for catheters, rectal tubes, etc.

Dressings, Etc.

Adhesive Plaster (2 inches by 5 yards, spool) *(deteriorative)*. For securing dressings to skin, and for minor abrasions.

Bag, Hot Water (rubber) *(deteriorative)*. Fill to one-half its capacity with hot water, expelling the air before screwing down the stopper; then hold the bag upside down to be sure there is no leakage. Wrap bag in a bath towel and place over the desired area.

Warning.—Watch carefully to see that bag is not too hot, especially with an unconscious or delirious patient.

Bag, Ice (rubber) *(deteriorative)*. Break ice into small pieces by pounding it in a piece of canvas. Fill the bag to three-quarters of its capacity, expel the air, replace cover, and wrap bag in a towel.

Warning.—Never put the rubber directly on the skin.

Bandage, gauze (1, 2, and 3 inch). For retaining dressings.

Warning.—Do not bandage too tightly.

Bandage, suspensory. For supporting painful testicles, and retaining dressings in cases of orchitis.

Basin, dressing. For bathing patients and preparing solutions.

Catheter (soft rubber, sizes 10 to 20 French) *(deteriorative)*. To be used for drawing off the urine in an unconscious patient or one with an obstructing stricture of the urethra. Boil for 10 minutes before use, and handle only with sterile hands. Lubricate with sterile oil or vaseline before passing and use the utmost gentleness. Try the larger sizes first.

Cotton, aborbent (roll). For dressings, wipes, and for padding under bandages.

Warning.—Do not place in contact with wounds (use sterile gauze).

Eye Bath *(glass)*. To be used in bathing the eyes. Should be sterilized before using. (See Eye Wash under Eye, diseases of).

First-Aid Packet. Sterile dressings sealed in tin. For emergency treatment of wounds.

Forceps, hemostatic. For catching the ends of bleeding vessels until they are tied (ligated), and for use as a needle holder. Boil, with scissors and dressing forceps, for 15 to 20 minutes before using, and handle only with sterile hands. Dry well after use.

Gauze, plain, absorbent (roll). For dressings, etc. Should not be placed in contact with wounds until sterilized. Cut in pieces as desired.

Irrigator. For giving enemas, washing ears, etc. Fluids flow by gravity and bag should not be elevated more than 2 or 3 feet above the nozzle.

Medicine Glass. Graduated in teaspoons and tablespoons, for measuring doses of medicine. Keep clean.

Muslin (5-yard piece). Cut as desired for supportive dressings, slings, and for special bandages.

Pencil, hair. For applying collodion to dressings. Clean brush well after use to prevent hardening.

Pins, Scissors, and Dressing Forceps (set in case). For applying surgical dressings; the forceps for holding edges of wounds while suturing, and scissors for cutting sutures and dressings.

Spatula (3 inch). For mixing and spreading ointments on dressings.

Suture, surgical gut, untreated (boilable, No. 2, threaded in needle) (tube). For ligating blood vessels which must be buried. Place tube in formaldehyde solution, or boil with instruments. Break at file mark in sterile gauze, and handle only with sterile hands. Use hemostatic forceps as needle holder.

SUTURE, surgical gut, mild treatment (boilable, No. 2, threaded in needle) (tube). For suturing wounds. Handle as above.

SYRINGE, p. pipette. For injection of argyrol solution into urethra as preventive and treatment of gonorrhea (clap). Do not inject more than 1½ teaspoonfuls at a time.

THERMOMETER, clinical (in case). For taking patient's temperature. (See note under Fevers).

TOURNIQUET. For control of hemorrhage from arteries. To be wrapped around limb above bleeding point enough to stop the bleeding until other means can be taken. Use with caution. (See under Hemorrhage).

WIRE MESH, for splints (roll). For immobilizing fractured limbs and dislocations. Cut to desired size with heavy shears and mold to affected part after thorough padding. Secure with bandage.

Chapter II

FIRST AID

General Instructions

To maintain the high degree of physical fitness and mental alertness essential to the men of every ship, it is important that first aid be practiced until all hands are prepared to quickly and properly treat casualties. It is to be expected that accidents will occur during storms or freezing weather, or that there will be excitement and danger resulting from collision, fire, or battle. Often during such times of stress the necessary first aid materials are difficult to obtain or an unexpected number of casualties may require immediate treatment. *Only men trained in first aid* are able to improvise and adapt themselves to every situation.

If an accident occurs, and a medical officer is not available, the person giving first aid must take charge and administer emergency care to the victim.

Follow these general rules:

1. Be quiet and cool, don't get excited, and do the best possible with the facilities at hand.

2. Keep the injured man lying down. Do not move him more than necessary.

3. Locate all injuries. Remove only the clothing necessary to examine the injury. Clothing must be removed in such a way as to disturb the patient as little as possible. If necessary, the outer clothing should be ripped up the seam; the under clothing torn or cut. In removing shoes it is often necessary to cut them off when they cannot be removed otherwise without causing great pain or increasing the injury.

4. If a bone is broken, apply a splint before moving the patient.

5. Treat the most serious injuries first—

   (*a*) Stop severe bleeding.

   (*b*) If breathing has stopped give artificial respiration.

6. Treat for shock. Often when serious injuries occur, emergency treatment should consist of doing nothing other than keeping the patient comfortably warm and quiet.

7. Loosen tight clothing which may be present around the neck, chest, abdomen, legs, and ankles.

8. If there is vomiting, turn the head to one side so the vomited matter may escape easily from the mouth. This eliminates the risk of vomited matter going into the windpipe and choking the patient.

9. If the patient is unconscious, do not try to force him to drink, for he cannot swallow and may choke. If conscious and able to swallow, a few sips of water will be refreshing.

10. If stimulants are needed, whisky and brandy are not always indicated. In fact, there are conditions in which they do harm. Hot tea or coffee are excellent stimulants, as is also aromatic spirits of ammonia—a teaspoonful well diluted in water.

Injuries

SHOCK

Most injuries are followed immediately, or several hours after they occur, by a depression of the body's nervous system and other vital activities. This condition is usually known as "shock," although it is sometimes called collapse, exhaustion, or prostration. Shock following minor injuries is usually mild; however, shock brought on by more severe injuries is very serious, and is frequently the cause of death.

Remember: Shock, if it is not treated, may cause death even though the body injury is not of a type which ordinarily would prove fatal.

All injured men, unless they are bleeding or have stopped breathing, should be treated for shock before the actual body injury is treated. The more serious the injury, the more important it is to treat shock promptly.

Loss of blood, cold, fatigue, fear, and pain tend to make shock more severe, therefore relieve these conditions as soon as possible.

Symptoms

1. Blunted sensibility—Varies from faintness or dizziness in mild shock to drowsiness or complete loss of consciousness in severe shock.
2. Skin—Pale, cold, and sweaty.
3. Pulse—Weak and rapid.
4. Breathing—Irregular, sighing, gasping.
5. Nausea and vomiting—May be present.

Even though the symptoms of shock may not be present when the injured man is first examined, regular shock treatment should be given promptly, as the procedures which are used to treat shock also help prevent shock.

Treatment

1. Keep head low—Place patient on his back with the head slightly lower than the feet. If the face is flushed, the head may be slightly raised.
2. Keep patient warm—In shock the body loses heat rapidly. Place a coat or blanket *under* and *over* the patient, and, if available, hot

water bottles may be placed alongside the body. (Be careful not to burn the patient.)

3. Stimulants—*Aromatic spirits of ammonia* is available for emergency use in handy collapsible tubes containing ½ teaspoonful of the liquid. The aromatic spirits of ammonia may be either inhaled by holding the open tube under the nose of the injured man, or the contents of the tube may be emptied into a cup of water and given to the injured man to drink.

   Hot *coffee* or *tea* may be given if the patient is conscious. The hot liquid helps warm the body, and coffee and tea contain caffeine, a good heart and breathing stimulant.

4. Morphine—Morphine is given to quickly relieve pain. For emergency use it is supplied in a handy collapsible tube and needle unit, commonly known as a "morphine syrette." The syrette contains enough morphine (½ grain) for one injection.

Directions for use: See page 8.

Serious Bleeding

The heart may be considered as a muscular pump which, by its beats, forces the blood to all parts of the body through a series of tubes known as blood vessels. The arteries carry the blood from the heart; the veins return the blood to the heart. The capillaries are a network of smaller vessels situated between and connecting the arteries and veins.

Arterial bleeding is recognized by the fact that the blood is bright red in color and spurts out with each heart beat. In venous bleeding the blood is dark red and flows steadily. Capillary bleeding occurs as a general oozing and is of a brick red color.

Bleeding from most wounds is easily controlled; however, if a large artery or vein is cut, bleeding will be severe and may cause death if it is not stopped promptly.

Three methods of stopping bleeding are:

1. Direct pressure over the wound.
2. Digital pressure over the main artery.
3. Tourniquet.

Direct Pressure

Most bleeding can be controlled by placing a sterile gauze pad directly over the wound and bandaging it securely in position. If necessary, apply pressure with the hand directly over the gauze pad until bleeding stops.

Elevation and rest of the wounded part decreases the flow of blood and assists clotting.

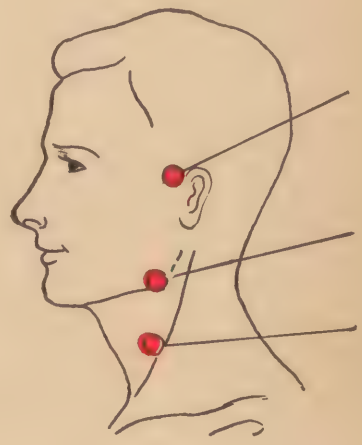
If the bleeding cannot be controlled by the use of a sterile gauze pad,

pressure with the fingers at the proper one of the six pressure points should be applied, as described below.

Digital Pressure

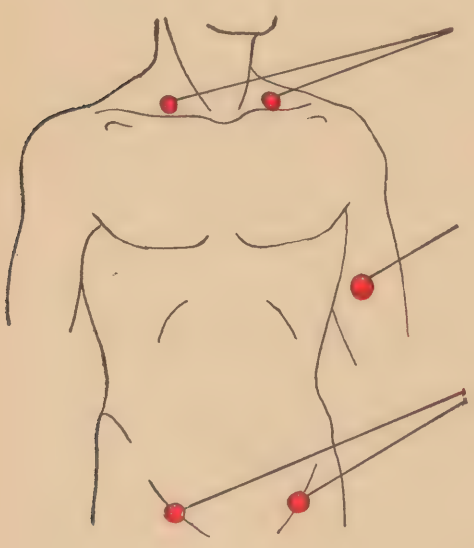
No first aid materials are required; therefore, digital pressure can be used *immediately* to stop severe arterial bleeding.

With the fingers, pressure is applied firmly to the main artery supplying blood to the injured part. Pressure is applied at a point between the heart and the wound where the artery is near the skin surface and lies over a bone.



The six major digital pressure points for controlling severe arterial bleeding are as follows:

For bleeding from the region of the temple and scalp apply pressure to a point just in front of the ear on the same side of the head where the wound is. This presses the main artery to the temple against the skull bone.



For bleeding from the cheek, below the level of the eye, apply pressure to a point on the lower edge of the jaw bone. Starting at the angle of the jaw, run the finger forward along the lower edge of the jaw bone until a small notch is found. The pressure point is at this notch.

For bleeding from the neck apply pressure below the wound just in

front of the prominent neck muscle. Press inward and slightly backward, thereby compressing the main artery of that side of the neck against the bones of the spinal column.

For bleeding from the shoulder or upper part of the arm apply pressure with the fingers in *back* of the inner third of the collar bone, thereby compressing against the first rib the main artery to the shoulder.

For bleeding from the upper arm, forearm, and hand apply pressure with the fingers on the inner side of the upper arm, about one-half way between the shoulder and elbow, thereby compressing the artery against the bone of the upper arm.

For bleeding from the thigh, leg, and foot apply pressure in the middle of the groin with the heel of the hand, thereby compressing the main artery of the lower limb against the pelvic bone.

When trying to control bleeding, fingers or dirty cloths should not touch the wound because of the danger of infection. However, in an emergency if no sterile gauze is available and if everything else fails, apply pressure directly to the wound.

Tourniquet

A tourniquet should not be applied to a limb unless all other measures available for stopping arterial bleeding have failed. These measures include the application of a pressure dressing to the wound, elevation of the part, tying off the visible end of the severed artery, and, as described on page 15, pressure with fingers over the artery above the bleeding point.

To be effective a tourniquet must be applied tightly enough to stop the arterial blood flow to the limb. Pressure from a tourniquet less than the arterial pressure will allow arterial bleeding to continue and may constrict the veins so as to increase bleeding from them.

A tourniquet properly applied interrupts the entire blood supply of that part of the limb which is below the point of its application. It must be loosened every 15 minutes. If left on continuously for more than 3 or 4 hours, severe damage to the tissues will result, and upon release of the tourniquet, swelling of the limb will take place and the patient may develop shock. If left on uninterruptedly for a longer period, gangrene of the limb will result; hence, the advice to loosen a tourniquet frequently and never to cover it with a dressing in such a way that its presence may be overlooked.

Tourniquets furnished in the Navy first aid kits are of two types—a rubber tourniquet and a cotton webbing tourniquet which is tightened by means of a buckle attached to one end.

When a tourniquet is the only available means of stopping hemorrhage, the following directions should be carried out:

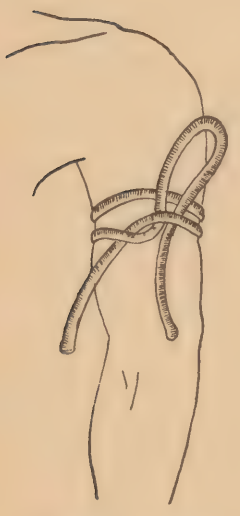
To stop severe bleeding from the arm apply a tourniquet about a hand's breadth below the shoulder.

To stop severe bleeding from the leg apply a tourniquet about a hand's breadth below the groin.

The rubber tubing tourniquet is quickly applied by stretching it and then wrapping it tightly twice about the injured limb and looping one end under the other to hold it securely in place.

The cotton webbing tourniquet is applied by wrapping it once about the limb, and then running the free end of the strap through the slit in the felt pad and thence through the buckle. The strap is then drawn sufficiently tight to stop the flow of blood. The skin is protected from the buckle by the piece of felt.

In an emergency tourniquets may be improvised from such articles as a belt, neckerchief, or any piece of cloth folded to make a flat band at least one inch wide and forty to fifty inches long. An improvised tourniquet made of a neckerchief is applied by wrapping the cloth band twice about the limb and tying a half knot. A short stick or similar object is then placed on the half knot and a square knot tied over it. The stick is then twisted rapidly to tighten the tourniquet and stop the flow of blood.



Rubber tourniquet.

Web tourniquet.

Spanish windlass.

A tourniquet must be loosened every 15 minutes. If bleeding does not start again let the tourniquet remain loosely in place. If severe bleeding begins, retighten the tourniquet for another 15 minutes.

WOUNDS

Wounds are divided into several classes; the treatment of those more commonly encountered is given in the following pages.

Treatment of Fresh Wounds

In the first aid treatment of all types of fresh wounds the three main points are—first, stop severe bleeding, second, treat shock, and third, prevent infection.

General directions for treating fresh wounds

1. Stop severe bleeding—Direct pressure, digital pressure, tourniquet.
2. Treat shock—Keep patient lying down and comfortably warm. Give morphine if necessary.
3. Prevent infection:

(*a*) Sulfadiazine—Each pill contains 0.5 gram of the drug and is peppermint flavored. These pills are taken by mouth to prevent infection. Four (4) pills are placed in the mouth and are to be chewed and swallowed. Small sips of water will aid in swallowing. If there is any delay in getting the patient to a doctor give one tablet (AND ONE ONLY) every 4 hours during the day. Do not give these tablets any longer than 2 days. Do not attempt to give tablets to a person who is unconscious or has serious injury of the mouth, throat, or stomach that would interfere with swallowing.

(*b*) Remove dirt from wound—Using sterile forceps or tweezers remove from the wound all visible dirt, bits of clothing, shrapnel, etc. *Note:* Metal instruments are sterilized by placing them in boiling water for at least 15 minutes. Do *not* attempt to probe or hunt for a bullet or other deeply buried objects. Do *not* touch wound with fingers. Do *not* wash a fresh wound with alcohol or other antiseptic solution.

(*c*) Apply sulfanilamide—Sterile sulfanilamide powder is carried in paper envelopes or packets, each of which contains about one tablespoonful of the powder. When needed, one end of the paper envelope should be torn off, and the sterile powder sprinkled lightly over the wound. Do *not* use more than two (2) packets in wounds of one person.

(*d*) Apply sterile gauze pad—Small and large size battle dressings, made of several thicknesses of sterile gauze, are carried in the first aid kit ready for emergency use. When opened, the small battle dressing measures 4″ x 6″, and the large battle dressing measures 12″ square. If battle dressings are not available, several thicknesses of regular sterile gauze may be used to cover the wound.

Note: It is advisable not to use sulfanilamide powder in wounds when sulfadiazine tablets have been administered by mouth.

(*c*) Bandage—Battle dressings are held securely in position by means of four gauze or muslin bandages attached firmly to the back of the sterile gauze pad. (Resembles a large four-tailed bandage). These bandages or "tails" should be wrapped snugly about the pad and the injured part. Roller gauze or triangular bandages are used to hold regular gauze pads in position.

The use of iodine or other antiseptics on fresh wounds is *not* recommended, as antiseptics may, in addition to killing germs, injure or kill the tissues surrounding the wound, thereby preventing healing. Recent experience with war wounds indicates that sulfonamides properly administered stops the growth of most germs causing wound infection.

If a wound is smeared with grease or oil, cover the wound with sterile gauze and cleanse around the wound with soap and water or alcohol. To avoid washing germs into the wound begin near the edge of the wound and wipe away from it—never toward it. If it becomes necessary to wash a wound to get the dirt out, use sterile warm water, mild soap, and a pad of sterile gauze as a sponge. A boiled common-salt solution (1 teaspoonful to a pint of water) is a very good one with which to wash and dress wounds. Be sure the water is sterile before applying it to the wound. (Should be boiled at least 15 minutes).

Gas gangrene is unlikely to develop in a wound as long as it is left open. Therefore it is usually best *not* to attempt to suture or close open wounds. Merely cover the open wound with sterile gauze.

Keep the patient at rest. Body defenses are best increased by complete rest of the body and by elevation of the injured part.

Under battle conditions it may be possible to give only very limited emergency treatment to wounds. Minimum treatment under such conditions would consist of:

1. Stop bleeding.
2. Cover wound with a sterile gauze pad (battle dressing).

At the earliest opportunity further treatment should be given as directed above.

Wounds Requiring Special Treatment

The symptoms and treatment of the following special wounds are described:

Infected wounds.
Puncture wounds.
Chest wounds.
Abdominal wounds.
Blast injuries.
Eye wounds.
Wounds caused by splinters.
Insect bites.
Dog bites.
Snake bites.
Bruises.
Strains.
Sprains.
Blisters.

Infected Wounds

War wounds and accidental wounds always contain many germs. Fortunately the body tissues, if given a chance, are capable of taking care of any infection that may be present. If, however, the germs are present in large numbers, they may overcome the body's resistance and spread into the surrounding tissues, producing what is known as an infected wound. This is especially apt to occur if the wound contains much dirt, bits of clothing, metal, etc., and if the tissues surrounding the wound are bruised and torn.

Symptoms

1. Pain—Throbbing in character.
2. Swelling—Tissues about the wound are swollen.
3. Inflammation—Skin about the wound is red.
4. Heat—Skin about the wound is warm.
5. Pus—Usually seen in the wound.
6. Red streaks—May radiate from the wound.
7. "Kernels"—Swollen lymph nodes or "kernels" may be found—

(*a*) In the groin, if the infection is in the leg.
(*b*) In the armpit, if the infection is in the arm.
(*c*) In the neck, if the infection is in the head.

Treatment

1. Rest—Rest of the infected part helps the body overcome infection.
2. Elevation—Elevation of the infected part helps reduce the swelling—thus improving circulation to the infected part.
3. Warm wet dressings—Apply warm wet dressings to the infected wound.

(*a*) Wet dressings are large, bulky pads made of gauze, absorbent lint, clean cloths, or towels. It is important that the pad be large enough to extend at least 5 or 6 inches beyond the infected wound in every direction, and it should be at least 1 inch thick. The dressing is wrung out in a warm solution of any one of the following—ordinary table salt, epsom salt, or boric acid. A solution of table salt should be approximately normal, that is, a teaspoonful of salt to a pint of water. A solution of Epsom Salt or Boric Acid should be saturated.

(*Note:* A saturated solution is made by putting as much of the salt or boric acid in the water as will dissolve.)

Warm Azochloramid solution may also be used as a wet dressing or soak for the infected wounds. Azochloramid tablets are carried in the medicine box and the solution is easily made by dissolving 8 tablets in 1 pint of water.

(*b*) Bandage the wet dressings in place.
(*c*) The dressings must be kept wet and warm. Change them as necessary.
(*d*) For the first six hours the wet dressings should be applied continuously. After that the wet dressings are applied only for an hour at a time, followed by a drying period of an hour. This alternate wet-dry treatment should be continued until the symptoms of infection disappear.

4. Warm soaks—Infections of the hands and feet are often treated more conveniently by "soaking" rather than with wet dressings. The infected part is merely immersed in a warm saturated salt, boric acid, or Azochloramid solution for several hours with drying intervals of ½ to 1 hour between soaks. The solution should be kept comfortably warm.
5. Do not cut or attempt to open an infected wound. Cutting with a knife through infected skin and other body tissues may only cause the infection to spread.

PUNCTURE WOUNDS

These wounds, also known as stab or bullet wounds, are caused by small piercing objects such as a nail, sharp stick, knife, or bullet.

Although the opening of a puncture wound may be small, the wound is often deep, and there may be serious internal bleeding.

Do not hunt for, or attempt to remove, deeply buried objects. In the case of bullet wounds look for wounds of entrance and exit.

Formerly many men with puncture wounds developed tetanus or "lockjaw" infection; however, this danger has been overcome by giving tetanus toxoid to all men in the United States Navy.

Treatment

1. Treat the wound as directed under "Treatment of Fresh Wounds."
2. The presence of internal bleeding is indicated by the development of symptoms of shock. Treat as directed under "Treatment of Shock."

CHEST WOUNDS

If the lung is punctured, patient will cough up frothy, bright red blood.

Treatment

1. Treat the wound as directed under "Treatment of Fresh Wounds."
2. Treat for shock as directed under "Treatment of Shock."
3. Bandage the chest firmly. Adhesive strapping of the injured side of the chest often makes the patient more comfortable.
4. It may be necessary to prop the patient up on pillows to make breathing easier, despite the fact that this position is not recommended for a patient in shock.

ABDOMINAL WOUNDS

There may be serious injury of the stomach, intestines (gut), large blood vessels, or other internal organs.

Do not give water by mouth if there is injury of the stomach or intestines.

Treatment

1. Treat for shock as directed under "Treatment of Shock."
2. If the intestine or gut is exposed, cover it with a sterile moist gauze dressing. Water which has been boiled for at least 15 minutes then allowed to cool to about body temperature should be used. If no sterile water is available, merely cover the wound with a dry sterile gauze dressing.
3. Sterile sulfanilamide powder sprinkled into the abdominal wound is of great value in preventing infection. (See "Treatment of Fresh Wounds.")

Blast Injuries of the Abdomen and Chest

Injury to the internal organs may be caused by pressure or suction waves set up by the detonation of high explosives in the air or in the water.

Usually there is no external evidence of a bruise or wound, but there will be signs of shock.

Treatment

1. Treat for shock as directed under "Treatment of Shock."

Eye Wounds (Foreign Bodies)

Small particles such as dirt, coal, or bits of metal may become lodged in the eye.

Treatment

1. Do not rub the eye.
2. Gently hold the lids apart and examine the surface of the eye and the inner surfaces of the upper and lower lids.
3. Gently wash out the particle with plain water or the 2 percent boric acid solution which is carried in the medicine box. Either the medicine dropper or the eye cup is useful for this purpose. They should be sterilized before use by placing them in boiling water for 15 minutes.
4. If washing is unsuccessful, brush the particle gently with a little cotton wound around the end of a match stick or a wooden applicator. The cotton should be moistened with clean water or boric acid solution.
5. If the particle is buried in the eye, do not attempt to dig it out. Instead, put two drops of 10 percent Argyrol in the eye, followed by several drops of clean mineral oil, castor oil, or olive oil.

6. Close the eyelid. Apply several thicknesses of gauze (1 inch thick) and secure with adhesive or gauze bandage. This prevents movement of the eyelid and keeps out light, thereby alleviating pain. Dress in this manner daily.

Wounds Caused By Splinters

Splinters of wood, metal, glass, and other materials frequently pierce the skin and remain buried in the tissues. If the splinter is deeply buried, make no effort to remove it, but treat the wound as a puncture wound.

Treatment

1. Sterilize the skin over the splinter with iodine.
2. If the splinter is clearly visible, open or pierce the skin with a needle or sharp knife point which has been sterilized by passing it through a flame several times.
3. Remove the splinter. For this purpose, forceps (tweezers) or a hemostat (small pincers) are useful instruments. They are carried in the first aid kit. Boil the instruments for 15 minutes before using.
4. Encourage bleeding from the wound (if it is superficial), thus washing it from inside out.
5. Apply a sterile gauze dressing.

BRUISES

A bruise is caused by a blow to some part of the body, and though the skin is usually not broken, there may be extensive damage to underlying muscles, tendons, blood vessels, and nerves. Blood oozes from the broken vessels into the soft tissues under the skin causing swelling and discoloration which is commonly known as a "black and blue" mark. A bruise is usually not serious; however, severe blows to the head, chest, and abdomen may result in serious internal injuries even though the only visible evidence of the injury is a "bruise."

Symptoms

1. Pain—Pain is felt at the site of the blow.
2. Swelling—Swelling is caused by blood oozing into the soft tissues under the skin.
3. Discoloration—A fresh bruise is red. Gradually the skin becomes "black and blue," then after 3 or 4 days becomes green or yellow.

Treatment

1. Rest—The injured part should be protected and kept at rest.

2. Elevation—A bruised hand or arm may be supported in a sling while a bruised leg should be elevated on pillows or folded blankets.
3. Cold (First 24 hours)—Apply an ice bag or cold cloths wrung out in ice water to the bruise during the first 24 hours.
4. Heat (After 24 hours)—After 24 to 36 hours the application of heat and gentle massage helps diminish the swelling and discoloration.
5. Bandage—The patient is often made more comfortable if a gauze or elastic bandage is applied snugly about the bruise.
6. Treat shock—If the bruise is complicated by serious internal injuries, it will be necessary to treat the patient for shock. (See "Treatment of Shock.")

STRAINS

A strain is a muscular injury caused by sudden, forcible, overstretching of the muscle fibers due to vigorous muscular effort such as lifting, running, or jumping. The muscles of the back are often involved, the thigh and leg muscles less frequently.

Symptoms

1. Pain—Develops in the muscle at the time of physical effort.
2. Lameness—The injured muscle is unable to function properly.
3. Swelling—Moderate swelling may develop at the site of the muscular injury.
4. Stiffness—The injured muscle becomes stiff and "knotted" as in the so-called "Charley horse."
5. Aching—The pain subsides and is replaced by an aching and tenderness.

Treatment

1. Rest—The injured muscle should be put at rest.
2. Elevation—If the strained muscle is in the arm support it with a sling. If it is in the leg elevate the leg on pillows or folded blankets.
3. Heat—Hot wet gauze dressings, hot water bottles, or a heat lamp may be used to apply heat to the injured area.
4. Bandage—Apply an elastic bandage or adhesive strapping so as to keep the injured muscle relaxed. An elastic bandage is excellent to make pressure, control swelling, and provide additional support.

SPRAINS

A sprain is an injury of the joint ligaments caused by an abrupt stretching or twisting of a joint beyond its limit of motion. The ankle, knee, finger, and wrist joints suffer most frequently.

Symptoms

1. Pain—Sharp pain is felt in the joint at the moment of injury.
2. Swelling—Develops rapidly about the joint.
3. Lameness—Movement of the joint increases the pain.

Treatment

1. Rest—The injured ligaments should be put at rest by preventing use or movement of the joint.
2. Elevation—If the injured joint is in the arm or leg, the injured part should be elevated to help reduce pain and swelling.
3. Cold (first 24 hours)—An ice bag or cloths wrung out in ice water should be applied to the injured joint for the first 24 hours.
4. Heat (after 24 hours)—After 24 to 36 hours the pain will have subsided and heat and gentle massage should be applied to obtain early return of joint function.
5. Bandage—A snugly fitting adhesive or elastic bandage about the joint helps support the injured ligaments. Care should be taken to loosen the bandage if it interferes with circulation of the blood.

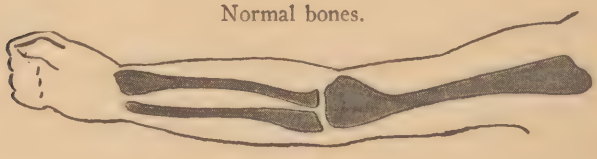
Sometimes it is difficult to tell the difference between a sprain and a fracture. If in doubt, treat as a fracture.

FRACTURES

A fracture is a broken bone.

Fractures are of two types:

1. Simple—Bone is broken, but there is no connection with the surface of the skin.
2. Compound—An open wound extends from the skin surface to the broken bone. The broken bone may or may not protrude from the wound.



Normal bones.

Symptoms of a Simple Fracture

1. Pain and tenderness—At site of fracture.
2. Swelling—At site of fracture.
3. Unnatural position——Compare injured limb with uninjured limb.
4. Loss of motion or power—May or may not be present.

5. Grating movement—Broken ends of the bone may be felt grating together.
6. Following a blow or injury the patient may say he heard the bone crack and give way.
7. Shock may be present.

Symptoms of a Compound Fracture

1. All of the symptoms described under simple fractures may be present. In addition:
2. Open wound—An open wound extends down to the broken bone. The bone may or may not protrude from the wound.
3. Bleeding—Bleeding from the wound may be quite serious due to the torn blood vessels.
4. Shock—Shock is usually severe.

General Procedures in the Treatment of Simple Fractures

1. Avoid moving patient. *Treat him where he lies.*
2. Remove clothing over the injured part. Handle part carefully. If necessary, clothing may be cut or torn along the seams.
3. Apply splint—A splint is any material used to prevent movement of the broken bones.

Do not attempt to "set" a broken bone. A broken long bone of the arm or leg should be straightened carefully before applying the splint; however, an injured joint, such as the elbow, should not be straightened, but should be immobilized with a splint in whatever position it is found.

REMEMBER: The blood vessels, nerves, muscles, and other soft tissues surrounding a broken bone are easily injured by movement of the sharp ends of the bone. Rough handling may convert a simple fracture into a compound fracture.

General Procedures in the Treatment of Compound Fractures

1. Stop bleeding—Direct pressure. Digital pressure. Tourniquet.
2. Treat wound—See "Treatment of Fresh Wounds."

3. Straighten limb—If the end of the broken bone is protruding slightly from the wound, it will often disappear when the injured limb is carefully and gently straightened; however, *do not force the end of the bone back into the wound.*
4. Apply a splint.

Emergency treatment is described for fractures of the following bones:

Arm.	Rib.	Skull.
Leg.	Collar bone.	Spine.
Jaw.	Nose.	

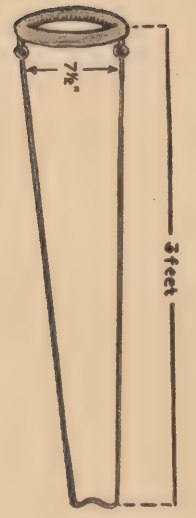
Fractures of the Arm and Leg

Emergency splints used on the arm and leg are of two types:

1. Fixed-traction splints.
2. Improvised rigid splints.

Fixed-traction splints

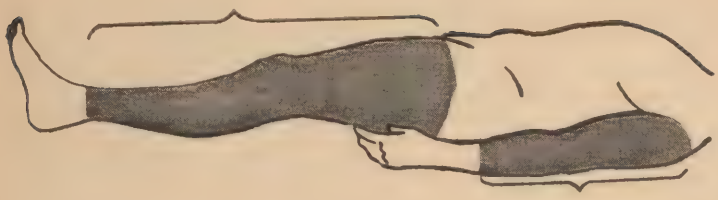
Fixed-traction splints for the arm and leg are usually available aboard ship.



Fixed-traction splint for the arm.

Fixed-traction splint for the leg.

Apply a fixed-traction splint for all fractures located between the hip and the foot.



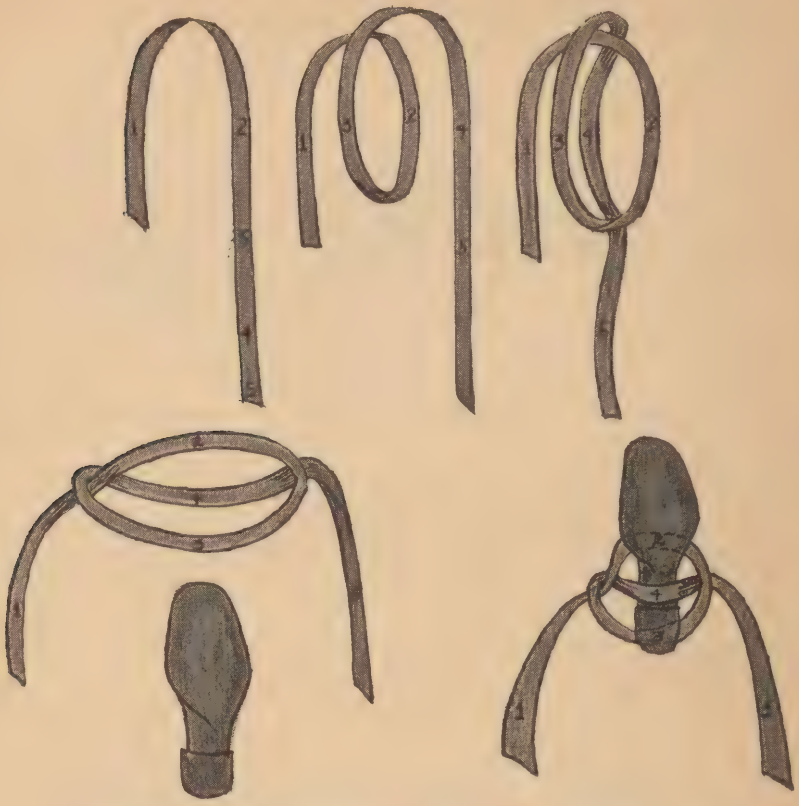
Apply a simple rigid splint and sling for all fractures located between the shoulder and the middle forearm. See page 33.

Diagram of sites for application of splints.

APPLICATION OF FIXED-TRACTION SPLINT TO THE LEG

The method of applying a fixed-traction splint to the leg is similar to the method described above for the arm. The end of the splint must be kept elevated to prevent the heel of the foot resting on the deck or ground.

Fixed-traction splint applied to leg.

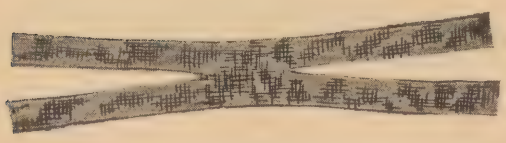


Preparation of traction-bandage for looping and applying to foot.

Fracture of Lower Jaw

Symptoms

1. Deformity—Line of lower teeth is irregular.
2. Bleeding—From mouth (gums).
3. Pain—Opening and closing mouth extremely painful.



"Four-tailed" bandage.

"Four-tailed" bandage applied to jaw.

Treatment

1. "Four-tailed" bandgage. Muslin or gauze.
2. Feed patient through a tube.
3. Cleanse mouth frequently.

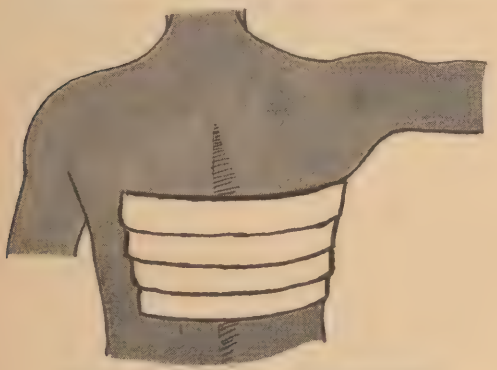
Fracture of Rib

Symptoms

1. Pain—Over point of fracture—increased by deep breathing and coughing.
2. Cough—If lung is punctured, will cough up frothy and bright red blood.

Treatment

1. Splint fractured rib—Wide strips of adhesive tape, applied so as to almost encircle the chest, decrease movement of the broken rib. First, shave hair from chest. Then after the patient has completely exhaled, apply several strips of 2½ inch wide adhesive tape, each succeeding strip overlapping the one below by 1 inch. The strips should encircle the chest, except for a space of about 8 or 10 inches on the uninjured side.



Chest strapped with adhesive plaster.

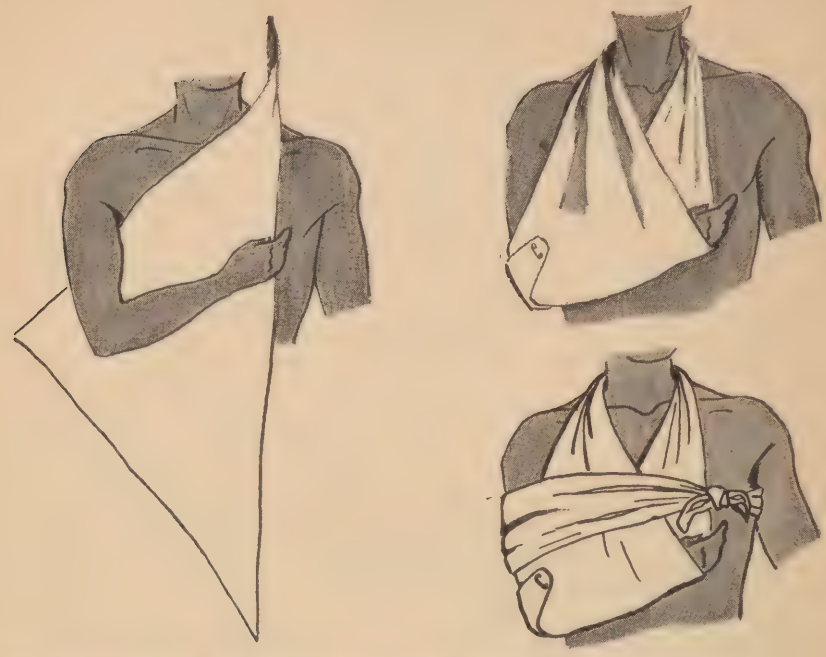
Fracture of Collar Bone

Symptoms

1. Deformity—Collar bone is near skin surface and broken ends of bone are easily seen.
2. Shoulder is low—Injured shoulder drops downward, inward and forward.
3. Pain—Movement of arm is painful. Patient usually supports elbow of injured side with opposite hand.

Treatment

1. Arm sling—Temporary or emergency dressing. The sling is made of triangular bandage, neckerchief, etc., and is used to support the arm on the injured side. The arm is drawn close to the body by means of a cloth or gauze band which is tied around the injured arm and chest. As soon as possible apply the "figure-of-eight" bandage.



Stages of applying arm sling and encircling band for emergency treatment of broken collar bone.

2. "Figure-of-eight" bandage—Made of long strips of muslin or gauze. Before applying this bandage, large cloth or felt pads must be placed under the arms. This bandage requires daily adjustment. An arm sling should also be worn to help support the arm on the injured side.

Back Front

"Figure-of-eight" bandage for treatment of broken collar bone. An arm sling should also be worn.

Improvised Splints

In an emergency, if fixed-traction splints are not available, splints may be improvised from materials found near the scene of the accident. Suitable materials for splints are boards, oars, paddles, boat hooks, light spars, guns, bayonet scabbards, or heavy wire mesh. Soft, flexible materials such as pillows, blankets, coats, cardboard, or folded newspapers

Diagram showing where splints should be placed for fractures of the arm or leg.

make excellent splints for fractures of the lower arm or lower leg if properly applied.

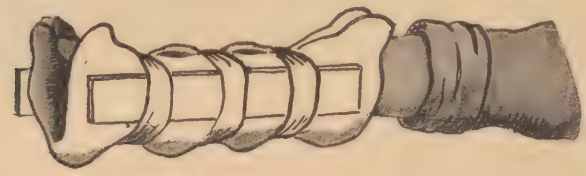
An improvised splint must be:

1. Rigid enough to keep the broken bone from moving or bending.
2. Long enough to extend well beyond the joints above and below the broken bone.
3. Reasonably light in weight.
4. Padded with soft materials such as cotton, gauze, cloth, or oakum (old rope untwisted and pulled into loose hemp).

Improvised rigid splint made from a well padded board applied to a fracture of the upper arm. After application complete sling.

Wire mesh splint for the arm. A roll of mesh wire 5 inches wide and 36 inches long is standard equipment in Navy first-aid kits. With it excellent splints may be made for the upper arm, elbow, or lower arm. It should be well padded. After application complete sling.

(*a*) Fracture of the upper arm.
(*b*) Fracture of the elbow. Do not try to change the position of an injured elbow. Apply a splint to the elbow in whatever position it is found.
(*c*) Fracture of the forearm (lower arm).
(*d*) Fracture of the thigh (upper leg).
(*e*) Fracture of the lower leg.



Pillow splint applied to the lower leg. Boards have also been used to give greater rigidity; however, they are not always necessary. Folded blankets or coats could also be used. Folded newspapers or cardboard may be used for fractures of the forearm (lower arm).

If materials for leg splints are not readily found, the thighs and legs may be bound together using the uninjured leg as a splint. Soft padding should be placed between the legs.

Fracture of Nose

Injuries to the nose result from blows or falls and fracture of the nasal bones should always be suspected.

Symptoms

1. Deformity—The nose may be flattened or out of position.
2. Nosebleed.
3. Swelling and tenderness.

Treatment

1. Control nosebleed—The patient should sit upright and breathe through the mouth. If the patient remains quiet for a few minutes, the bleeding will usually stop; however, if it continues, pressure may be applied gently by means of the thumb and forefinger. If this fails, narrow gauze strips (½ inch wide) may be inserted into the nostril.
2. Splint nose—Place two small rolls of gauze on either side of the nose. Secure the rolls of gauze with strips of adhesive tape.

Skull Fracture

Skull fractures are serious chiefly because of the possibility of injury to the brain.

Symptoms

1. Bruise or wound of the scalp.
2. Loss of consciousness.
3. Pupils unequal.
4. Bleeding from the ears or nose.
5. Vomiting.

The above symptoms are not always seen; however, any man "knocked out" by a head blow, even though for only a moment or two, should be kept quiet and in a reclining position.

Treatment

1. Keep patient lying down.
2. Treat shock—See "Treatment of Shock."
3. Cold cloths or ice bag to head.
4. Treat scalp wound if present.
5. If the patient is very restless, sedatives such as bromides or one of the barbiturates (Sodium Amytal, Nembutal) may be given. Morphine should not be given.
6. Observe the patient's condition carefully. Record the pulse, respiration, and temperature every half hour. A rising pulse and respiration rate with a temperature above 101.5° or 102° indicates serious brain injury.

Fracture of the Spine (Broken Neck or Back)

Fractures of this type are often caused by a fall from a height, diving into shallow water, or a heavy weight falling across the shoulders when the body is bent forward.

The spinal column not only supports the head and body, but it also contains the spinal cord which carries nerve impulses to and from the brain. Severe fractures of the spine may, therefore, cause the spinal cord to be crushed or cut in two, so that it can no longer carry nerve impulses. If this occurs, the lower part of the victim's body will be found partially or completely paralyzed. Fortunately, however, in many cases the spinal cord is not seriously injured even though the neck or back has been broken, and if the patient receives proper emergency treatment, he will recover completely.

Symptoms

1. Pain—If in the neck, the neck may be broken. If in the back, the back may be broken.
2. Paralysis—If present, it means the spinal cord has been injured. If the injured man cannot move his legs, his back is broken, and if he cannot move his fingers, his neck may be broken.

It must be remembered that if the neck or back is broken, twisting or bending of the neck or body may injure the spinal cord and result in paralysis or death of the victim. Do not attempt to move an injured person, or raise his head until he has told you whether he can move his fingers and legs.

First Aid Treatment and Transportation

1. Treat patient for shock (see page 14).
2. If the *neck* is broken, the injured man should be transported lying on the back, *face upward*. Taking great care not to bend or twist the body or neck, the patient should be slid or drawn by his clothing on to a rigid stretcher or improvised support such as long, well padded boards or planking. Lifting should only be attempted if at least four, and preferably six, men are present to assist. Blankets should be placed under and over the injured man. Do *not* put a pillow under the head or neck; however, pillows or sandbags should be placed alongside the head to prevent turning.
3. If paralysis is present, all hard uneven objects, such as buttons or buckles, should be removed from the clothing beneath the paralyzed parts to prevent the development of pressure sores.

DISLOCATIONS

These are injuries to joints; the head of a bone has slipped out of its socket.

Causes.—(1) From a blow or fall; (2) muscular action.

Symptoms.—Shock, pain, swelling, loss of function, limited motion, and the head of the bone may be seen out of its usual place. The limb may seem lengthened or shortened, according to the way in which the dislocation has taken place.

Treatment.—The proper treatment is reduction and retention by some means of immobilization. It is better for a layman not to attempt reduction except, perhaps, in dislocations of the fingers and the lower jaw. By unskilled attempts at reduction a layman may cause considerable damage to the nerves, vessels, and soft parts.

Put the part in the position most comfortable to the patient. The joint

should be surrounded with cotton and a bandage applied, not too tight, and then supported. The patient should be kept as quiet as possible. If the joint involved is the shoulder, elbow, hip, knee, or ankle, the patient should be kept in bed. If the joint is painful and greatly swollen, hot or cold applications may be applied. A sling makes a good support to the shoulder, elbow, and wrist joints. If shock is present, treat it. Have patient see a doctor as soon as possible.

RUPTURE (HERNIA)

As encountered by the layman this is usually a swelling in the groin. Rupture makes its appearance suddenly after exertion and is evidenced by pain and swelling.

Treatment: Let patient take a hot bath and go to bed, lying on his back with thighs bent. By so doing, the rupture will often reduce itself. Keep patient in bed for several days and do not let him move until he has seen a doctor.

If the rupture does not reduce itself it may be damaged by rough or unskilled handling. The patient should see a doctor as soon as possible, as the condition, if unrelieved, may cause gangrene of the bowel and death.

BLISTERS

Water blisters develop on the skin as a result of local irritation such as chaffing or pinching. They most commonly occur on the hands and feet. It is important to remove the cause of the friction (such as ill-fitting shoes) as soon as possible. If an unusual amount of unavoidable pressure or rubbing of the skin is anticipated, blisters can often be prevented by placing a strip of adhesive plaster firmly over the area.

Treatment (Not for blisters caused by burns.)

1. Wash—The blistered area should be washed gently with clean water and soap.
2. Apply iodine—After drying the skin carefully, apply iodine to one edge of the blister.
3. Sterilize needle—Sterilize a needle in an open flame.
4. Puncture blister—Puncture the blister at its edge where the skin was sterilized with iodine. Gently press out the water.
5. Apply dressing—Apply a dry sterile gauze pad over the blister.

If the blister ruptures, a raw painful area will be exposed. This should be protected with a small amount of vaseline, and then covered with a sterile gauze dressing.

If the blister becomes infected, it should be treated as an infected wound. (See "Treatment of Infected Wounds.")

BURNS

Burns, in general, are caused by such agents as hot air, hot liquids, steam, hot solids, sunlight, acids, alkalis, electricity, and irritant gases. The majority of burns occurring aboard naval vessels during war are of the "flash" type, due to the hot blast of shell and bomb explosions and burning ammunition.

The severity of burns is variable, the amount of tissue destroyed depending upon the degree of heat and the length of time that the skin is exposed to the burning gases. Fortunately, flash from explosions is but momentary, although a high degree of heat is generated. Burns are classified according to the depth to which the body tissues are damaged, as follows:

First degree—Skin reddened.
Second degree—Skin reddened and blistered.
Third degree—Destruction of the entire skin. Often there is injury to the tissues underneath.

The size or extent of a burn may be more important than its depth. A first or second degree burn which covers a very large area of the body ordinarily causes much greater shock to the victim than a small third-degree burn.

Shock brought on by extensive burns is the most serious factor in causing death. Therefore, when treating seriously burned casualties, first treat them for *shock* and then treat the burn.

Treatment

1. Shock:
   (a) Conserve body heat—Do not remove all of patient's clothes immediately, but keep him comfortably warm with blankets or whatever is at hand.
   (b) Relieve pain—Administer a syrette of morphine (½ grain).

2. The Burn:
   (a) Expose burned area—Carefully remove the clothing that covers the burned area, but do not remove more clothing than necessary. In the case of a large burn, prevent chilling by exposing only a part of the body at one time. If the clothing sticks to the burn, cut the cloth around it but do not attempt to remove any adherent clothing. Leave it in place.
   (b) Protect the burned area—Apply petrolatum (vaseline) over the burned area. If vaseline is not available, use liquid petrolatum or clear lubricating oil. Apply sterile gauze smoothly over the ointment or oil-covered burn in sufficient number of layers to make a fairly thick dressing. Secure the dressing with roller gauze bandage. Such pressure as is consistent with comfort is to be used in the bandaging. If a medical officer is not available, the dressing is not to be changed for about 14 days, or until healing is well begun.
   (c) Give Sulfadiazine:—Give the patient 4 tablets (4 grams) of Sulfadiazine in a single dose.
   (d) Supply ample fluid intake—Men who have been severely burned require an increased amount of liquid. Regularly, once each hour, water or some other liquid, such as fruit juice, should be given to the patient.

(e) Acid and alkali burns—In case of an acid or alkali burn, get any clothing soaked with the chemical off the victim as quickly as possible. Pour water freely over the burned area in order to remove the chemical. In the case of extensive burns place the patient under a shower if immediately available. In the case of an acid burn finally apply a solution of bicarbonate of soda or common baking soda. If of the alkali type finally apply ordinary vinegar. After once more washing with water, treat the condition as in the case of any other burn of the skin.

3. Burns of the Eye—Burns of the eye may result from hot gases, steam, acids, lye, or other strong alkalis, and flash from explosion.

(a) Wash with water—All burns of the eye, from whatever cause, should immediately be flushed with large quantities of water.

(b) Oil Treatment—After thoroughly washing with water, mineral oil or castor oil should be gently dropped into the eye.

Prevention of Flash Burns

Experience has shown that almost any cloth fabric will protect against flash burns, but for complete protection, the entire body must be covered. Antiflash equipment has been adopted by the Navy to accomplish this covering and consists of a face mask of such a weave as to permit easy respiration, an eye-shield of flash-resistant plastic, hood, and gloves.

To protect himself from flash, the man first pulls his socks up over the *outside* of his trouser legs, and then adjusts the face mask, hood, eye-shield and gloves in that order. The lower portion of the hood should be kept in place by tucking it securely under the dungaree collar.

Antiflash garments may be improvised in any manner, the important thing being complete coverage of the skin. Recently a flash-resistant cream has been developed and will probably come into more general use. The cream is merely applied to the head, neck and hands as in the case of a skin lotion, and permitted to dry. The kapok life-jacket (with filler treated to render it flame-resistant) offers protection against flash burns.

BLAST OR CONCUSSION

Blast or "concussion injury" may occur at the site of naval actions or sinkings where men are swimming or floating in the water in the immediate neighborhood of exploding depth charges.

These injuries are caused by the "shock wave" set up by the blast, which travels rapidly through the water (4,800 feet per second) and when at high pressure (about 300 pounds per square inch) close to the charge, produces severe injury to the swimmer as it strikes his body and is transmitted through it.

Blast injuries consist of hemorrhage into the lungs and perforations of the intestine. Thus, it is the air- or gas-containing organs that are affected and the injuries may be either mild or so severe (in the case of the lungs) as to cause almost instant death.

Blast injury may be suspected in personnel who have been in the water where any explosion has taken place. The symptoms of pulmonary injury are the raising of bloody or brown sputum, coughing, gasping respiration, a bluish color of the skin, and rales in the chest. Those who have suffered intestinal damage from blast describe feeling the concussion as a powerful blow in the stomach, followed by cramps, and often by loose bowel movements while still in the water. The stools are frequently tinged with blood and there is persistent abdominal pain.

Treatment

Blast injuries are serious and require the care of a physician for proper handling, but one can prevent aggravating the condition by employing certain common-sense procedures. Victims should be handled carefully and moved about as little as possible to avoid increasing bleeding in the lungs. Morphine may be given (½ grain) to control pain and if oxygen is available it may be administered through a regular, or improvised mask with beneficial effect. Sulfadiazine should be given to combat the development of infection. Perforation of the intestine requires a surgeon for adequate handling and where this event is suspected—persisting high fever with tender, hard abdomen—every effort must be made to obtain medical aid. These people should not be given food or water by mouth when evidence of intestinal injury persists. They should be kept at rest, in bed.

Prevention

From a practical standpoint, we are particularly concerned with means by which blast injury may be *prevented*, rather than with its pathology and treatment, since proper treatment is not always possible. Crews should be instructed in the following ways of avoiding injury from underwater explosions.

(*a*) Wear a kapok life jacket (when possible), properly tied and adjusted. It is a "life preserver" that will protect from underwater concussion as well as from drowning.

(*b*) Swim away from an expected underwater explosion as rapidly as possible since a person will be safe from injury by a 300-pound depth charge at about 300 feet.

(*c*) Make use of any floating objects to draw yourself as far out of the water as possible, for only those parts of the body below the surface can be injured by underwater blast.

(*d*) Keep your head out of water, and when floating, lie on your back, as high in the water as possible.

(*e*) Do not lie on a partly submerged raft or float when underwater explosions are expected. Stand or sit.

FIRST AID TREATMENT OF SHIPWRECK SURVIVORS

Survivors may be afflicted with injuries received during combat previous to abandoning ship; these include burns, flesh wounds, and broken bones, possibly with consequent shock. These conditions should be kept in mind and, if present, should be treated as directed elsewhere in this compendium. The treatment of such symptoms of underwater blast injury as the coughing of blood and abdominal pain and rigidity is also discussed in another section, as is that of immersion foot and frost bite. The occurrence of high fever may indicate pneumonia caused by exposure.

Men who are weakened from lack of food and water should be helped aboard ship and carried to a bunk, particularly if their feet have been injured by cold. In general, the rescued survivor can be given all the water he can comfortably take as often as he likes. If he is very weak, during the first and second day, the food should be in a liquid or soft form, such as sweetened fruit juices and condensed milk to which sugar has been added, toast, and cooked cereal. If vitamin pills are available, they should be given to survivors who have been shipwrecked for about 10 days or more.

Sunburn should be treated like any other burn. Eyes whose lids are crusted should be treated frequently with eye drops of a weak solution of baking soda or boric acid in water.

The removal of dirty fuel oil from the skin can be facilitated by using a light oil such as mineral oil as a wash, followed by soap and water.

Boils and ulcers are sometimes found on the skin of survivors. Clean the skin, remove any crusts from the sores, if it can be easily done, and dust on some powdered "sulfa" drug, if it is available. Do not touch the sores on the legs of those suffering from immersion foot.

Mental disturbances are common in survivors; they may be excited, or very depressed. Someone should stay with survivors who are mentally abnormal, to make sure they do not hurt themselves.

METHODS OF PROLONGING SURVIVAL ON LIFEBOATS AND RAFTS

Methods of protecting against such effects of cold as frostbite and immersion foot have been described on pages 45-46

The following paragraphs deal with other methods of prolonging survival at sea, particularly as regards the rationing of food and water. The information is presented in the form of instructions issued to the survivor. All of it is applicable to survivors on lifeboats or rubber rafts. Many of the instructions, however, cannot be followed by those on floats.

Seasickness

Even in survivors accustomed to ships, on a raft or lifeboat seasickness

may be so severe as to cause loss of water from the body through vomiting and to interfere with efficient operation of signalling devices. Some life raft kits contain a medicine preventing seasickness. If the water is rough, as soon as you have boarded your craft, take the seasickness preventive as directed on the label.

Protection Against the Weather

Against cold—The most serious adversary in *cool waters* is the effect of cold wind and water upon the body. Under such conditions, leave on all clothing, dry or wet, save when a favorable moment for drying some of your clothing is encountered. Then be sure to dry your clothing as much as possible. Great pains should be taken to dry out wet stockings and footgear whenever possible in order to reduce chances of the injury due to cold and wet known as "immersion foot." The lacings of footgear should be loosened when you board your craft, and if later the feet become swollen and the footgear feel tight, the boots or shoes should be removed. (Do not throw them away—you'll need them when you get ashore). Exercise your toes from time to time to increase circulation of blood.

Even in the tropics you may become cold at night if you cannot dry out your clothing before nightfall.

Against sunburn—Because its effects come several hours after exposure, sunburn always tends to "slip up on you," particularly in cloudy weather. Rig an awning if you can, but be sure it does not shut you off from the cooling effects of the breeze in warm weather. Do not cover your body with a tarpaulin or poncho for protection against sunburn in warm weather, as if they rest directly on you they will prevent cooling and increase your water requirement. If no satisfactory awning can be rigged, the head, including the neck, can be protected by use of cloths that may be available or by sunburn-preventive ointment. The boric ointment contained in some raft first aid kits can be applied to the lips in the absence of antisunburn ointment to prevent cracking. Protect your eyes from glare and nose from sunburn by tying a strip of cloth over your nose just under your eyes. Leave your shirt, trousers, and socks on. Hands can be protected by the sunburn-preventive ointment or by tucking them under your shirt. The unprotected space over the lower legs can be covered by using a safety pin to attach trouser bottoms to sock tops.

Method of Conserving the Water in Your Body

The amount of water which you need to keep you normal depends on how much water you waste from your body unnecessarily. You cannot help losing slightly less than a pint of water in your urine each day; also you will always lose some vapor in your breath. But in warm weather you will lose more water than is necessary *by evaporation from*

your skin unless you take steps to prevent the loss. When the sun strikes you, it heats your body. Your temperature will rise unless you are cooled by the breeze and unless water evaporates from your body to cool you. This water leaves your skin long before you can see any drops of sweat. Unless you take precautions, you may sweat away unnecessarily a quart or more of your precious water each day. Unless you are already cold, the only way to prevent this "unseen sweating" is to take the following steps to keep your body cool, adding a new procedure, while continuing the former ones until you feel definitely chilly. Then omit the procedure which made you cold for awhile; try it again after an hour or two. By keeping yourself just short of being chilly, you will keep your unseen sweat loss at a minimum.

The procedures for saving water are as follows:

1. Perform no unnecessary exercise.

2. Remove (but do not throw away) all clothes save the head covering, shirt, pants, and socks necessary to protect you from sunburn. Unbutton the front of your shirt.

3. Expose your body thus clothed to the breeze as much as possible. It will cool you. Fewer of the sun's rays will strike and overheat you if you sit up as much as you can, rather than lying flat.

4. Rig an awning if you can, protecting you from the sun, but not interfering with the breeze. Do not use for this purpose an article which will rest directly on your body and interfere with circulation of the air.

5. Keep your clothes *constantly* wet with sea water during the day. The sea water will evaporate and cool your body, and you won't have to sweat and evaporate the water stored in your tissues in order to keep your temperature form rising. This procedure is the only way you can prevent unnecessary water loss on a bright or only moderately overcast day in warm waters *when there is no wind.* Probably you will find it most satisfactory to shower yourself or each other thoroughly with the bailing cup. Wetting your clothing by going overboard for a swim will use up your strength if you do it often. Carefully rinse the accumulated salt out of your clothes with sea water from time to time so that the salt will not hurt your skin. Let your clothes dry in the late afternoon if they will, otherwise you may be chilly at night even in the tropics.

Of course, if you are in cool waters and your problem is to keep warm, you don't have to worry about these five procedures for reducing the unseen sweating. And if you or others on the raft are injured, you will have to use your head as to how vigorously you carry out these procedures.

How to Ration Your Water

The amounts of water recommended below will satisfy you only in cool weather, or in warm weather when you are taking the recommended

steps to prevent unseen sweating. If you allow unseen sweating to occur, you may waste a quart (32 ounces) or more of your water daily.

1. Unless you become thirsty, drink no water for the first 24 hours on the raft. Take a drink of water before abandoning ship.

2. Thereafter, drink 16 ounces of water a day if your supply is limited; drink 24 ounces a day if you have plenty of rain water, or more if you continue to be really thirsty and your supply permits it.

3. When you have a total of only about 10 ounces of water left per man, use it merely to moisten your mouth and throat occasionally until rain is encountered.

If it rains when you have been drinking 16 to 24 ounces of water a day or less, drink your fill slowly over the course of about 1 hour. Next day return to your usual 16 to 24 ounce allotment.

If your craft is equipped with a kit for treating sea water to make it drinkable, ration out the treated water in the same amounts recommended above.

If you have no special device for measuring water available, remember that a coffee cup holds about 8 ounces, or half a pint. A quart is 32 ounces.

If you see a rain squall approaching, wash off any accumulations of dry salt on your rain-collecting sheet with sea water so you will contaminate the rain with salt as little as possible when it starts falling. One useful method of transferring rain water from the sheet to a container is to use a sponge or rag. If your rain water has been contaminated with sea water and has a salty taste, go ahead and drink it. If it doesn't make you vomit or give you diarrhea when you drink it in small amounts, it's all right.

Don't drink your urine.

Don't dilute your fresh water with sea water. You won't gain anything. Don't drink straight sea water or put sea water into your rectum.

You may smoke if you can and care to. You may find it increases your thirst, however.

Solid Food

In warm waters, one can survive several weeks without food provided one has water. In cooler waters when shivering uses up the body's supply of energy rapidly, the eating of food is probably important to survival, and the daily ration should be larger than that for warm waters.

Various types of ration are now found on emergency craft; many of them are of the candy type. Candy, which contains chiefly sugar and fat, has been found a very satisfactory ration for survivors.

The daily allotment of solid ration per man will have to be decided upon by the leader of a group of survivors, taking into consideration the type of ration, the temperature of air and water, and the number of men on the craft.

FISH AND BIRD FLESH

The flesh and liver of fish, turtles, and birds are valuable foods; but do not eat them in large quantities unless you have an abundance of water. Too much of this food, because of the protein it contains, may cause you to waste water from your body as urine.

If your ration of water is less than 24 ounces a day, eat only small quantities of flesh—say 10 one-inch cubes, equal to 5 ounces, daily or if the fish is a shark, skate, ray, or dogfish, only 4 such cubes daily. Be sure not to let the flesh dry out before eating it if you are short of water, and reduce the amount eaten if it makes you persistently thirsty.

Eat no *dried* flesh or entrails unless you are drinking a quart (32 ounces) of water a day. Reduce the amount eaten if it makes you persistently thirsty.

You will probably not be able to wring or chew "water" out of fish flesh. Regard fish as a solid food, not as a source of water.

Coconuts, which you may find floating in the water, are a useful source of food. Eat them in small amounts at first; if they cause no diarrhea, you can eat all you want, even if your supply of water is limited. The same holds for the milk they contain.

EXPOSURE TO COLD AND HEAT

Though one may be working in severe cold or excessive heat, the body is usually able to maintain a normal temperature of about 98.6 degrees. Prolonged exposure to extremes of temperature will, however, cause a marked rise or fall in the body's temperature as well as other changes in the body's vital functions which may prove fatal unless promptly treated.

Exposure to Cold

Prolonged exposure to freezing temperature, 32 degrees or below, will result in freezing of the body tissues. Exposure to a temperature somewhat above freezing may cause body injury if the effect of the cold is intensified by dampness and high wind. The injury to the tissues may be localized as in immersion foot and frostbite, or generalized as in prolonged exposure of the whole body.

IMMERSION FOOT

This condition, which is similar to frostbite, is most often seen in men who have abandoned ship and are exposed for long hours to cold and wind, frequently with their feet and legs immersed in icy water or covered by wet socks and shoes. The feet become first white, then blue, swollen, and painful. Blisters often appear upon the skin and infection may set in. During the war of 1914-'18 a similar condition, known as

trench foot, was seen frequently after men had stood in cold, muddy trenches for long hours with their feet encased in water soaked boots and puttees.

Prevention

1. Apply mineral oil—Men who are forced to abandon ship should apply mineral oil or vaseline to their feet and legs at frequent intervals during the period of exposure. This helps protect the skin from the cold water.
2. Avoid tight shoes—Tight fitting shoes interfere with the normal circulation of blood in the feet, and it is helpful to wrap the feet loosely in odd bits of clothing. Elevation of the legs and exercising the toes is also of value.
3. Apply warmth—If the foot becomes numb, the shoe and sock must be removed and the foot warmed by placing it inside another man's clothing. *Do not massage or rub the foot.*

Treatment

When survivors are rescued with chilled, numb, swollen, and blistered feet, they should be carried aboard and their skin protected against rupture of the blisters.

1. Elevate legs—Place patient in a bunk and elevate the legs. The legs should be placed comfortably on dry, soft, woolen cloths or a dry bath towel.
2. Keep legs cool—The injured feet and legs must be kept cool. This is best done by exposing the legs below the knees to a cool room temperature and directing a blast of air from an electric fan or blower over them. Cooling the tissues helps relieve pain and reduce swelling.
3. Keep patient warm—The patient should be kept comfortably warm by placing a warm blanket over his body and thighs. Do *not* cover the legs and feet. Give nourishing hot liquids such as soups and chocolate milk drinks.
4. Treat blisters—If blisters form, treat with sterile vaseline dressings as directed under the "Treatment of Burns."

FROSTBITE

This condition results from the freezing of a small part or area of the body—usually the ears, nose, cheeks, fingers or toes.

Prevention

1. Warm clothing—Wear a sufficient amount of warm, dry clothing.
2. Apply warmth—If the ears, nose, or cheeks begin to tingle or appear

red, they may be warmed by holding the warm ungloved hand over them for a short time. The fingers may be warmed by placing them inside the clothing next to the body, and similarly the toes may be warmed by placing the foot inside the clothing of a shipmate.

Symptoms

1. Tingling of the part—First warning.
2. Redness of the skin—First warning.
3. Numbness—Tissues frozen.
4. Grayish-white color of the skin—Tissues frozen.
5. Bluish color of the skin—Late signs.
6. Swelling of the tissues—Late signs.
7. Blisters of the skin—Late signs.
8. Black color of the skin—Tissues dead.

Treatment

1. Keep frozen part cool—Thaw or warm the frozen part very slowly. This is best done by immersing the frozen part in ice cold water which is gradually warmed to body temperature.
2. Keep patient warm—Apply heat to the rest of the body by means of warm blankets. Give patient hot liquids such as hot coffee, soups or hot chocolate milk.
3. Protect skin—The skin covering the frozen part should be gently cleansed with soap and water, and after the part has thawed out it should be placed on dry, soft, woolen cloths or a dry bath towel.
4. Treat blisters—If blisters form, treat with sterile vaseline dressings as directed under the "Treatment of Burns."

CAUTION—In treating immersion foot or frostbite *do not* massage the frozen part, and *do not* apply heat to the frozen part.

EXPOSURE OF THE WHOLE BODY TO COLD

Prolonged exposure of the whole body to severe cold results in a general depression of the vital body functions.

Symptoms

1. Numbness—Arms, legs, and body feel numb.
2. Movement slow—Arms and legs feel heavy.
3. Drowsiness—Unconsciousness may develop.
4. Breathing is slow——Breathing becomes gradually slower and may stop.
5. Pulse is slow and weak.

Treatment

1. Apply artificial respiration, if breathing has stopped.

2. Wrap patient in warm blankets.
3. Treat frozen parts of the body as directed under "Frostbite."
4. Give hot coffee or tea as soon as patient is conscious.

Exposure to Heat

Under ordinary conditions, when the body is overheated, the excess heat is lost by the evaporation of sweat from the skin surface. Prolonged exposure to high temperatures may result, however, in one of the following conditions:

1. Heat cramps—This condition is usually seen in men working in the engine room. It is due to the loss of large amounts of salt from the body by sweating.
2. Heat exhaustion—This condition results from the over-heating of the body. Sweating cools the body only if the sweat is evaporated. In heat exhaustion the *skin is sweating profusely*, but evaporation and cooling are prevented by such external obstacles as heavy, tight-fitting clothing, poor ventilation, or a high moisture content of the surrounding air (high humidity).
3. Heat stroke (Sunstroke)—This condition results from the failure or "breakdown" of the body's cooling system. Though the body is overheated, the *skin fails to sweat*, and since the excess body heat cannot be lost by evaporation, the temperature rises to dangerous and frequently fatal heights.

Heat cramps, heat exhaustion, and heat stroke occur after exposure to heat, either indoors or outdoors, and are largely due to the loss of body salts in perspiration.

Prevention

When working in overheated surroundings one should —

1. Take an increased amount of salt. 1 salt tablet should be taken with each glass of water, or 1 teaspoonful of salt should be added to each quart of drinking water.
2. Take an increased amount of water. 3 or 4 quarts of water may be needed in one day.
3. Wear light, porous, loose-fitting clothes.
4. Use blowers or electric fans to ventilate all compartments in which men are working.
5. Do not work too long in overheated surroundings. Regular short rest periods should be permitted.
6. Eat a moderate amount of light, easily digestible food such as vegetables and fruit. Avoid fats and heavy greasy foods.
7. Avoid the over use of alcohol.

Symptoms

Heat Exhaustion

1. May collapse and faint, but usually remains conscious.
2. Skin—pale.
3. Skin—sweaty.
4. Pulse—weak and rapid.
5. Breathing—shallow.
6. Mouth temperature—normal or below normal.
7. Seldom causes death.

Heat Stroke

1. Suddenly collapses and loses consciousness.
2. Skin—red, flushed.
3. Skin—hot and dry.
4. Pulse—strong and rapid.
5. Breathing—deep, snoring.
6. Mouth temperature—very high, from 105° to 110°.
7. Frequently causes death.

Treatment

Heat Exhaustion

1. Remove patient to a cool comfortable place where he can rest.
2. Loosen clothing.
3. Keep the head low.
4. Give the patient plenty of water to drink.
5. Give salt. May be given in the form of salt tablets or 1 teaspoonful may be added to each quart of drinking water.
6. If the patient is in SHOCK, wrap blankets about him and give warm liquids such as coffee or tea.

Heat Stroke

1. Remove patient to a cool place.
2. Place patient in a tub of ice water.
3. Rub skin vigorously. This brings the blood to the surface where it is cooled.
4. Remove patient from the tub when the body temperature drops to 102°.

An excellent method of treatment which does not require a tub or ice is as follows:

1. Remove patient to a cool place.
2. Spray a fine stream of water over the body. For this purpose tepid water is as good as ice water.
3. Fan the body by means of hand or electric fans. Cooling results from the rapid evaporation of water from the body surface.

HEAT CRAMPS

Symptoms

1. Severe, painful, muscular cramps, involving particularly the muscles of the abdomen, legs, and arms.
2. There may be symptoms similar to those of heat exhaustion.

Treatment

1. Apply hot water bottles or hot cloths to the abdomen and other areas of muscle cramping.
2. Keep patient at rest.
3. Give plenty of water.

4. Give salt in the form of salt tablets or added to the drinking water. (1 teaspoonful to a quart of water.)

ARTIFICIAL RESPIRATION

Breathing may stop as a result of such accidents as:

1. Drowning.
2. Electrical shock.
3. Carbon monoxide poisoning.
4. Suffocation due to smoke, gas, fumes.
5. Prolonged exposure to cold.

Even though the victim of one of the above accidents has stopped breathing, his heart usually continues to beat for some time, and because of this fact the victim's life may be saved if breathing can be resumed before the heart stops.

Natural breathing may be restored after it has stopped by promptly applying the Schaefer Prone Pressure Method of artificial respiration. The purpose of artificial respiration is to force breathing. Pressure on the victim's chest forces air out of the lungs. Release of pressure lets the lungs expand and draw air in. Thus air is kept moving in and out of the lungs so that the body can get the necessary oxygen to keep alive. If artificial respiration is started soon enough and kept up long enough, the heart will continue to beat and the victim will start normal breathing again.

If breathing stops, begin artificial respiration *at once*. Every second counts so waste no time. Do not take time to examine the patient, loosen clothing, etc., but let an assistant do that.

STANDARD TECHNIQUE

POSITION

1. Lay the patient on his belly, one arm extended directly overhead, the other arm bent at elbow and with the face turned outward and resting on hand or forearm, so that the nose and mouth are free for breathing. (See inset Fig. 1.)

2. Kneel straddling the patient's thighs with your knees placed at such a distance from the hip bones as will allow you to resume the position shown in Figure 1.

Place the palms of the lands on the small of the back with fingers resting on the ribs, the little finger just touching the lowest rib, with the thumb and fingers in a natural position, and the tips of the fingers just out of sight.

FIGURE 1.—First movement.

3. With the arms held straight, swing forward slowly, so that the weight of your body is gradually brought to bear upon the patient. The shoulder should be directly over the heel of the hand at the end of the forward swing. (See Fig. 2.) Do not bend your elbows. This operation should take about 2 seconds.

FIGURE 2.—Second movement.

4. Now immediately swing backward, so as to remove the pressure completely. (See Fig. 3.)

5. After 2 seconds, swing forward again. Thus repeat deliberately 12 to 15 times a minute the double movement of compression and release, a complete respiration in 4 or 5 seconds.

As soon as artificial respiration has been started and while it is being continued, an assistant should—

1. Examine the victim's mouth and wipe away the sticky mucous or saliva which frequently blocks the exchange of air through the

mouth. Also remove from the mouth any object, such as false teeth or particles of vomited food.

2. Loosen clothing about the victim's neck, chest, and waist.
3. Keep the patient warm. Without interrupting artificial respiration cover the victim with blankets or coats, and if hot water bottles are available, place them alongside the body.

Resuscitation should be carried on at the nearest possible point to where the patient received his injuries. He should not be removed from this point until he is breathing normally of his own volition, and then

FIGURE 3.—Third movement.

moved only in a lying position. Should it be necessary, due to extreme weather conditions, to move the patient before he is breathing normally, resuscitation should be carried on during the time he is being moved.

Continue artificial respiration without interruption until normal breathing is restored, if necessary, 4 hours or longer. Even though the victim appears dead, do not give up. Remember that the usual tests for death, such as absence of heart beat and pulse, are not acceptable for these cases.

Beginning recovery is indicated by a slight catch of the breath or sigh. Breathing gradually becomes deeper and more regular and the operator should attempt to time his compression of the chest with the breathing efforts of the patient. Discontinue artificial respiration after the patient is breathing regularly; however, watch carefully and be ready to resume artificial respiration if the breathing stops.

In carrying out resuscitation it may be necessary to change the operator. This change must be made without losing the rhythm of respiration. The relief operator should kneel beside the one giving the artificial respiration with the operator astride one leg of the patient and the relief astride the other leg. The relief, then, goes through the motions until he

has established exact rhythm with the operator, when he takes over from the first operator. By this procedure no confusion results at the time of the change of operators, and a regular rhythm of pressure and release of pressure on the patient's thorax is kept up.

After the patient revives, treat for shock.

(*a*) Keep patient warm with blankets, and give warm liquids such as coffee or tea.

(*b*) Keep patient lying down.

(*c*) Keep patient quiet.

DON'TS in drowning cases.

Do not roll the victim over a barrel or similar object.

Do not "jack-knife" the body, or hold the victim upside down in an effort to get water from the lungs. It is much more important to get started at once giving artificial respiration. Usually there is little or no water in the lungs anyway.

Remember: The most important thing in giving artificial respiration is to GET STARTED AT ONCE.

INSECT BITES

Insect bites, such as those produced by mosquitos, fleas, ants, and bees, require but little treatment. The local application of a solution of baking soda or dilute ammonia water affords considerable relief.

Bites of the more poisonous spiders and scorpions are often severe and require prompt treatment. Poisonous spiders do not sting but actually bite. The poison is contained in sacs at the base of the fangs through which it is transmitted by small tubes. Scorpions occur practically all over the world and are especially common in the tropics. The stinger and venom sacs are located in the tail of the scorpion.

Symptoms of Poisonous Spider and Scorpion Bites

1. Pain—Spider bites are usually felt as a sharp prick and the pain is not severe. However, the sting of a scorpion causes intense pain.
2. Slight swelling—The swelling at the site of the bite is usually not pronounced.
3. Shock—Symptoms of shock develop within ½ hour to 2 hours. Patient becomes anxious and restless. He is very thirsty and nausea and vomiting may develop.
4. Muscular cramps (Spiders)—About ½ hour after the spider bite painful muscle cramps begin near the bite then spread to involve the other muscles of the body.

   Numbness (Scorpions)—Numbness and partial paralysis develop at the site of the scorpion sting, and if the sting is on the arm or leg, the part becomes useless for a time.

5. Death—Adults rarely die from spider or scorpion bites although they are often made very ill. The severity of symptoms depends largely upon the size of the individual.

Treatment

1. Tourniquet—(*a*) If the bite occurs on the patient's arm or leg, apply a tourniquet above the bite just tight enough to stop the return flow of blood through the veins. This does not require much pressure—just enough to make the veins swell. When applied to an arm or leg the hand or foot will turn a dusky bluish color.
   (*b*) Release the tourniquet every 15 minutes for 1 minute.
2. Treat shock—(*a*) Keep the patient lying down and at rest.
   (*b*) Body heat may be conserved by placing a blanket under and over the patient.
   (*c*) The severe muscle pains which follow poisonous spider bites are sometimes relieved by hot baths. Morphine may be given if necessary to relieve the pain. (See method of administering the morphine syrette under "Treatment of Shock.")

ANIMAL BITES

Animal bites are usually badly torn and dirty wounds which are likely to become infected unless careful immediate treatment is given. In addition to this usual danger of infection there is the even more serious danger of rabies. The disease rabies most commonly occurs in dogs, but wolves, cats, goats, sheep, horses, and pigs are also occasionally infected. Animals having rabies transmit the germs through the saliva to man at the time of biting.

If rabies once develops in man it cannot be cured; therefore, prevention of the disease is of utmost importance. A preventive treatment known as the Pasteur vaccine treatment is available and is almost 100% effective. When a person is bitten by an animal suspected of being rabid, it is important not only to treat the patient's wound but also to keep the animal confined and under observation. After the patient has received first aid treatment of the bite wound, he should be transferred to the nearest Naval or civilian hospital along with a complete report of the circumstances involved in the animal bite.

Treatment of Bite Wound (Suspected rabid animal)

1. Wash—Using soap and plenty of water carefully wash the wound and surrounding skin area. After all saliva and dirt have been removed, dry the area with sterile gauze.
2. Cauterize—The wound should be cauterized as soon as possible with

foaming nitric acid. If the cauterization is done within 12 hours the patient may be protected. A red hot needle may be used to cauterize the wound if nitric acid is not available.

3. Gauze dressing—Cover the wound with a dry sterile gauze dressing.

Care of the suspected animal

Do not shoot the animal but shut it up in a safe place and observe it for at least 3 weeks. If the animal has rabies it will die of the disease within 7 to 10 days. The time required for rabies to develop in man after being bitten is 3 to 8 weeks. Thus, while the animal is under observation, it is safe to wait a few days before starting the Pasteur preventive treatment.

If the animal dies its head should be removed, packed in ice, and sent at once to a laboratory where a definite diagnosis of rabies may be made by examining the animal's brain.

The Pasteur vaccine treatment should be given—

(*a*) If the animal is known to be rabid.

(*b*) If the animal cannot be found after the biting.

(*c*) If the animal is killed too early for a definite laboratory diagnosis of rabies.

(*d*) If the animal develops symptoms of rabies during the 3 weeks' observation period.

SNAKE BITES

Poisonous snakes, such as the rattlesnake, copperhead, water moccasin, coral snake, pit viper, and cobra, have teeth arranged in two rows with a pair of fangs near the fore part of the jaw. These fangs have either a groove or a canal through which the poison is injected at the time of the bite. Nonpoisonous snakes have four rows of teeth without fangs, and therefore the imprint of the bite will sometimes enable one to determine whether a person has been bitten by a poisonous or nonpoisonous snake.

The majority of snake bites occur on the leg or thigh and therefore prevention is possible to a great extent by wearing high leather shoes or leggings.

Symptoms

1. Pain—Severe pain develops rapidly at the site of the bite.
2. Swelling—The skin around the bite becomes swollen, tender, and red.
3. Shock—Within 15 minutes to 2 hours the patient develops nausea, vomiting, and loose watery bowel movements. Faintness sets in, followed by drowsiness. The skin becomes pale and sweaty, and the arms and legs are cold. The pulse is rapid and weak and breathing is labored. Muscular weakness and difficulty in swallowing and speaking gradually develop. The poisonous venom is usually absorbed slowly and therefore the symptoms of collapse and prostration often develop gradually over a period of hours or days.

4. Death—Death occurs in many untreated cases. The patient may go into a state of unconsciousness, his breathing gradually weaken, become slower and finally stop.

Treatment

1. Prevent absorption of the venom:
   (*a*) Apply a tourniquet above the snake bite just tight enough to stop the blood flowing back through the veins. The veins should "stand out" prominently on the skin.
   (*b*) Release the tourniquet every 15 minutes for 1 minute. As the swelling spreads, it will be necessary to reapply the tourniquet higher above the snake bite.

2. Remove the venom:
   (*a*) Sterilize a sharp knife blade with a match flame.
   (*b*) Make several "crisscross" cuts at each fang mark and in the swollen area surrounding the bite. The cuts should be about ½ inch in length and deep enough (about ¼ inch) to permit free oozing of the clear lymph from the swollen tissues. Avoid cutting through large veins.
   (*c*) Apply suction at the snake bite and at the site of each "cross" cut in the swollen area. Suction is applied for 20 minutes out of every hour either by mouth or with a glass suction syringe. Any venom accidentally swallowed during mouth suction will be destroyed in the stomach and produce no symptoms; however, it is not advisable for mouth suction to be applied by anyone with cracked lips or open sores in the mouth.
   (*d*) Between suction periods keep the cuts covered with gauze pads soaked in Epsom salt solution.

3. Treat for shock.
   (*a*) Give the patient plenty of water to drink.
   (*b*) Keep the patient lying down and at rest.
   (*c*) Conserve body heat by covering the patient with a blanket or coat.

   Note: The patient should not receive stimulants such as alcohol.

4. Antivenom:
   (*a*) Antivenom has been prepared to neutralize the venoms of most poisonous snakes. The proper antivenom, if it is available, should be injected into the muscles of the arm or leg.

POISONS

Prevention.—Keep all poisonous drugs and solutions locked up. Label all bottles with their contents and a *Poison* label. See that all bottles are properly labeled and no drug is put in them that does not belong there.

In treating patients for poisoning the indications are:

1. To neutralize the poison (give antidote).
2. To get rid of the poison from the stomach (produce vomiting and preserve material for chemical examination).
3. To prevent further absorption into the system of the poison that may have remained in the stomach (oils, etc., except in case of phosphorus poisoning).
4. To cause elimination from the system of the poison that may already have been absorbed (large drafts of water, purgatives, etc.).
5. In case of collapse, to sustain and support the body strength (by stimulants, external application of heat, etc.).

Unknown poison.—Produce vomiting. This can be done by giving 2 teaspoonfuls of mustard in a cup of warm water; can also be induced by 2 teaspoonfuls of common salt in a cup of warm water; soapsuds; encourage patient to put fingers down throat. Syrup of ipecac, 1 tablespoonful in cup to tepid water, is also a good emetic. After vomiting, give whites of raw eggs, or milk, or flour in water. If signs of collapse are present, give hot tea, coffee, and other stimulants. Keep the body warm and rub the extremities.

Bichloride of mercury.—Give whites of two raw eggs. If these are not on hand give milk, or raw meat chopped finely in water or milk, or give soap and water. Then cause vomiting and later give strong tea, flour in water, flaxseed tea, or barley water. Keep the patient warm, and, if stimulants are necessary, give strong coffee. Cases must be treated with as much haste as a severed artery.

Strong mineral acid (as nitric, sulfuric, hydrochloric, etc.).—Give no emetic. Neutralize the poison by giving alkalies, such as large quantities of water, milk of magnesia, or milk with borax, chalk, or lime-water (plaster). Baking soda and soapsuds may be given to neutralize hydrochloric acid only. Follow with olive oil or other demulcent drinks as for carbolic acid. Place patient in recumbent position and keep body warm. Give aromatic spirit of ammonia and other stimulants.

Carbolic acid (Creosol, phenol).—The treatment indicated is to immediately give a strong solution of Epsom salt in warm water and induce vomiting by giving mustard and water, salt and water, or putting fingers down throat. Then give demulcent drinks such as milk, flour in water, egg whites, flaxseed tea, or barley water, followed by hot tea, strong

coffee, or other stimulants. Keep body warm. Alcohol may be used for local burns. If breathing stops, apply artificial respiration.

Alkalies (lye, etc.).—The treatment indicated is to give mild acids such as vinegar, lemon or orange juice, hard cider. Whites of eggs may be given later, then give something soothing, such as oil, gruel, barley water, milk, butter, or lard. Place patient on back; apply heat externally; fresh air; strong coffee or other stimulants.

Opium, laudanum, paregoric, heroin, morphine.—Give an emetic. The best emetic in this case is mustard and hot water. Something irritating is needed to start vomiting, as the nerves of the stomach are dulled by the opium. Give strong tea or coffee, if patient is unable to swallow, inject into bowel. Keep patient awake by applying cold water to head and face, slapping him with wet towel, and walking him about, but do not exhaust patient by overdoing this. Give no wines or liquors. When respiration is slow and irregular, apply artificial respiration.

Arsenic, Paris green, Rough on Rats.—The best antidote, if it can be obtained, is two teaspoonfuls of magnesia, one tablespoonful of tincture of iron in a cup of water; take as one dose. Give an emetic; the whites of raw eggs and a large amount of greasy or salty water may be given. Lime water, or plaster in water may be given. Later gruel, sweet oil, starch and water, and castor oil (1 ounce) may be given.

Strychnine (nux vomica).—Give strong tea, then administer an emetic until free vomiting is induced. Give Epsom salt. Apply artificial respiration if necessary. Remove patient to a dark room, keep quiet, avoid sudden noises. Give phenobarbital to control spasms to the limit indicated under that drug.

Trinitrotoluene (TNT) poisoning.—Because of the extensive use of this substance on board ships and in naval magazines ashore, poisoning caused by it is not uncommon.

The poison may be removed from the skin with a solution of sodium hyposulfite. Remove the patient from the vicinity of the substance, provide absolute rest, fresh air, and simple diet. Large amounts of water with large doses of sodium citrate and sodium bicarbonate should be given. Restrict the meat intake, give small doses of iron daily, and regulate the bowels.

Gasoline, benzine, wood alcohol and naphtha poisoning.—This usually results from inhalation of fumes or accidental swallowing in siphoning, etc. Symptoms from the ingestion of gasoline resemble those caused by acute alcoholism, the patient is very apt to develop mania and later become unconscious.

Remove the patient to the open air, remove all gasoline, benzine, or naphtha-soaked clothing, apply external heat if necessary. Administer stimulants and treat as for carbon-monoxide poisoning.

Carbon monoxide.—Most frequently results from exposure to exhaust fumes of gasoline motors particularly in confined spaces and after entering airtight compartments closed for some time. (See section on ventilation.)

The treatment indicated is: (1) Remove the patient from atmosphere containing monoxide; (2) administer oxygen as quickly as possible and in as pure a form as is obtainable, preferably from a cylinder of oxygen through an inhaler mask; (3) if breathing is feeble, start artificial respiration at once by prone-pressure method; (4) keep the patient flat, quiet, and warm; (5) afterward give plenty of rest.

Chloral hydrate ("knock out" drops).—Overdose renders person suddenly helpless. Symptoms start with burning sensation in throat, nausea, vomiting and pain in stomach. Later, patient becomes cold, relaxed, comatose and blue. May die from paralysis of the respiratory center.

The stomach should be emptied by an emetic, patient kept warm and artificial respiration administered if necessary. Strong black coffee is valuable as a stimulant, if patient is conscious and stomach has been evacuated.

Barbital (veronal), luminal, nembutal, sulphonal, etc.—The symptoms of poisoning are headache, mental confusion, staggering gait, difficult breathing, stupor and coma. There may be skin eruptions and paralysis of various types.

Vomiting should be induced. Stimulation and artificial respiration should be used according to need.

Iodine.— Poisoning may be caused when the Tincture of Iodine is applied too heavily or when swallowed. The vapor is irritating to the eyes and respiratory system. When swallowed, the mouth and lips are corroded and stained and there is pain, thirst, vomiting, suppression of urine, diarrhea, and collapse.

Administer starch in water, freely; induce vomiting, apply external heat and establish absolute rest.

Chemical Warfare Agents

Emergency Treatment of Cases Exposed to Common War Gases.

General Rules.—The sooner self-aid first-aid treatment is administered, the greater are the chances of early recovery. *There must be no delay—quick action is paramount.*

CHEMICAL WARFARE

Tactical Class	Physiological Class	Symbol	Name	Odor	Color and State
CASUALTY GASES	Blister Gases	H	Mustard	Garlic Horse-radish	Dark-oily Liquid Colorless Gas
		HN	Nitrogen Mustards	Faint; Fishy	do
		L	Lewisite	Geraniums	do
		ED	Ethyldichlorarsine	Biting and Stinging	Colorless or Brown Liquid Colorless Gas
		PD	Phenyldichlorarsine	Shoe Polish	Clear Viscid Liquid
		Mixed	H and L HN and L, etc.	Combination of H and L	Combination of H and L
	Choking Gases	CG	Phosgene	Musty Hay Green Corn	Colorless Gas
		DP	Diphosgene	do	do
		PS	Chlorpicrin	Flypaper Licorice	Yellow Oily Liquid Colorless Gas
	Blood and Nerve Poisons	CL	Chlorine	Chloride of Lime	Greenish Yellow Gas
		AC	Hydrocyanic Acid	Bitter Almonds	Colorless Liquid or Gas
		CC	Cyanogen Chloride	Biting	do
HARASSING GASES	Tear Gases	CN	Chloracetophenone	Apple Blossoms	Cloud of Particles Droplets
		CNS	Chloracetophenone Solution	Fly Paper	do
		CNB	Chloracetophenone Training Solution	Sweetish Benzine	do
		BBC	Brombenzyl Cyanide	Sour Fruit	Colorless Liquid or Gas
	Vomiting Gases	DM	Adamsite	Coal Smoke	Yellow Cloud
		DA	Diphenylchloarsine	Shoe Polish	White or Gray Cloud
		DC	Diphenylcyanarsine	Garlic Bitter Almonds	White Cloud
SCREENING SMOKES		HC	Hexachlorethane Mixture	Sharp; Stinging	White to Gray Smoke
		FS	Sulfur Trioxide	do	Dense White Smoke
		FM	Titanium Tetrachloride	do	White Smoke
		WP	White Phosphorus	None or Burning Matches	Burns to White Smoke in Air
INCENDIARIES		TH	Thermite Magnesium Bomb	None	White Hot Metal; Burns with White Light
		IM NP	Thickened Gasoline	Burning Oil	Yellow Jelly Black Smoky Flame

REFERENCE CHART

rsistence	Effect on Body	Protection	Self-Aid Must be Immediate
)ay to Winter Iours Days	No immediate symptoms. 3 to 36 hours later irritates Eyes, Skin, Nose, Lungs. Worse in Tropics.	Gas Masks Eye Shields	EYES. Wash out with water. SKIN. Blot off liquid. Rub in ointment S-461 or S-330. Do not use in Eyes or on reddened Skin. CLOTHES. See L.
)ay to Veek o 12 urs urs to ys	Immediate stinging pain of Eyes and Skin. Irritates Nose, Throat, and Lungs. Worse in Tropics.	Protective Clothing Protective Covers	EYES. Squeeze ointment BAL into eyes. SKIN. Blot off liquid. Rub in ointment BAL. Do not use on reddened Skin. CLOTHES. Remove clothing contaminated and discard. Avoid fumes. Treat underlying Skin.
	Combination of H and L.	Protective Ointments S-461, S-330	EYES. Ointment BAL. SKIN. Ointment S-461 or S-330. Remove. Use BAL. CLOTHES. As L.
o 10 nutes Minutes	Coughing. Choking. Difficulty in breathing. Fluid in Lungs.	Gas Masks	If breathing becomes difficult keep quiet and comfortably warm until given medical attention.
Iour to Veek	Irritates Eyes. Same as CG.	Gas Masks	Rest and comfortably warm. Wash Eyes, Nose and Throat for irritation.
Minutes 1 Hour	Same as PS.	Gas Masks	Same as PS.
o 10 nutes	Dizziness, headache, coma.	Gas Masks	Whiffs of amyl nitrite. First aid if not breathing is artificial respiration.
	Irritates Eyes, Nose, Throat. Also as AC.	Gas Masks	
Minutes Weeks Iour to Veek t ermined ys to eks	Irritates Eyes. Heavy concentration irritates Nose, Throat, and Lungs Also burns and blisters the skin in warm climates.	Gas Masks	Wash out Eyes with water and wash Skin with soap and water. Face upwind. Additional self-aid usually not necessary.
Minutes o 10 nutes	Irritates Eyes, Nose, and Throat. Vomiting, headache.	Gas Masks	Sniff chloroform. Keep masked. Lift mask only when actually vomiting. Additional self-aid usually not necessary.
ile ning o 10 nutes Minutes	Heavy concentration irritates Eyes, Nose, and Throat. FS and FM liquid burns Skin.	Gas Masks for heavy concentrations.	Wash out Eyes if irritating. Wash Skin burns with water. Additional self-aid usually not necessary.
Minutes	Burns Skin.	Avoid burning particles.	Keep wet with water or cover with copper sulfate. Remove particles. Do not use grease, salve.
	Heat, burns.	do do	Cool burning material and remove. Treat as any burn.

War gas may be defined as a substance which, by its chemical action, has a harmful effect on man, food, water and material. Its purpose is to keep the combatant from his object or to make him use such elaborate protection as will reduce his fighting effectiveness. At times it may be recognized as a solid, a liquid, a cloud of vapor or by its odor. However, there are some gases that can neither be seen nor smelled. It is wise, therefore, to regard any suspicious odor, gas, liquid or solid, or any feeling of choking irritation of eyes, nose, throat as indicating the presence of gas until proved otherwise. This also includes enemy smoke since it may mask a poisonous gas. Other chemical warfare agents include smoke for screening objects and incendiaries for starting fires.

CLASSIFICATION

1. For convenience war gases are classified according to their physiological action, persistency, and tactical use.

2. Physiological classification depends upon the main effect of the gas on the body. The gas may be a blistering, choking, vomiting, tearing agent, or a systemic poison.

3. Tactical classification depends upon the most important use of the gas in war. Casualty gases produce injury serious enough to put personnel out of action. Harassing agents retard operations because they force the wearing of masks and other protective clothing. Screening smokes obscure objects and prevent observation. Incendiaries ignite material and produce burns on personnel.

4. Persistency classification depends on the length of time the war gas remains effective under field conditions. As a general rule, it may be said that the persistency of war gases decreases under tropical weather conditions and increases in colder climates. Persistent gases remain effective longer than 10 minutes and may last for days or weeks. They are used to neutralize or force evacuation of certain areas. Non-persistent gases remain effective less than 10 minutes. They do not render areas untenable after the cloud has passed.

REFERENCE CHART

1. The chart summarizes present day concepts of war gases. The symbols are letters which have been designated to be used instead of the names of the various agents.

BLISTER GAS

These gases form the most important group of all war gases, not only because they seriously injure the unprotected body, but also because they

are most likely to be used should chemical warfare begin. It is wise, therefore, to study them in some detail, and to define clearly the decontamination measures which must be taken when exposed to them.

Recent reports prove that a specific routine of self-decontamination must be accomplished within 5 minutes if serious eye, skin and lung damage is to be prevented after contamination by a liquid vesicant gas. This must be begun by the individual himself. Speed is essential. There is no time to wait for help from others. However, if battle conditions at the time of exposure compel continuous manning of guns and stations, then self-decontamination must be accomplished at the earliest possible moment.

The fact must be recognized that the use of prescribed protective equipment is the most effective means of preventing serious injury from liquid vesicant gases.

Procedure of Self-Decontamination for Liquid Mustard

Instantly on contamination each man will carry out all of the self-decontamination procedures exactly and consecutively in the following order: (see The First Aid Kit—Gas Casualties, Medical Supplies, page 6.)

a. Liquid mustard vaporizes from the skin, clothing, equipment, and any other objects. Therefore, turn the face away and breathe as little as possible until the eyes and face are decontaminated and the mask is in place as directed.

b. When eye shields are not worn, wash eyes at once. Hold the lids open with fingers and pour water slowly from canteen or other uncontaminated source into one eye and then into the other. This must be done immediately after exposure; a delay of 2 minutes may result in blindness. Irrigate for at least 30 seconds and no longer than 2 minutes. If uncontaminated water is not available, use urine.

c. When eye shields are worn, irrigation of eyes is not necessary.

d. Blot, not rub, all visible liquid on the skin with the paper absorbent provided with the ointment, or any other suitable material.

e. Decontaminate hands by covering and rubbing for 20 to 30 seconds with ointment protective S-461 or S-330.

f. Decontaminate face, neck, and ears by covering and rubbing for 20 to 30 seconds with ointment S-461 or S-330. Avoid getting the ointment into the eyes, as irritation will result.

g. Discard the eye shield worn.

h. Put on the gas mask after the face, neck, and ears have been decontaminated. The mask must be on the face within 3 to 4 minutes at the latest after exposure.

i. Continue decontamination by covering all untreated exposed skin with the ointment, whether or not actual contamination can be seen.

j. If tactical conditions permit, remove contaminated clothing. Dispose of clothing in such a way that it cannot serve as a source of poisonous fumes. These cause serious eye, skin and lung damage.

k. If clothing has been removed, spread ointment on areas which may be contaminated.

l. If not possible to remove clothing, cover contaminated areas of clothing with protective ointment.

m. As soon as tactical conditions permit, remove all ointment, protective, S-461 or S-330, and bathe with soap and water.

Procedure of Self-Decontamination for Liquid Lewisite

Self-decontamination is the same as that described above for liquid mustard, except:

a. Ointment BAL is used as the specific decontaminant and substitutes ointment, protective S-461 or S-330 referred to.

b. When eye shields are not worn, pull open the lids with the fingers and squeeze ointment BAL directly into the injured eye or eyes, and gently massage the lids. If the eye cannot be opened because of pain, the ointment BAL should be applied to the closed lids and as well as possible rubbed into the slits between them. As soon as the pain lessens and the lid can be pulled apart, squeeze additional ointment BAL into the eyes.

c. Ointment BAL must remain on the skin for at least 5 minutes, after which it may be removed, when conditions permit.

Procedure of Self-Decontamination for Liquid Nitrogen Mustard

Self-decontamination is the same as described for liquid mustard.

Wash off the ointment at the earliest possible moment, since ointment protective S-461 or S-330 dissolves but does not effectively neutralize the nitrogen mustards.

Procedure of Self-Decontamination for Mixed Blister Gases

Self-decontamination is a combination of that described for mustard and lewisite gases.

Eyes.

a. If there is not immediate pain on contamination, it is to be assumed that mustard only is present and irrigation of the eyes as described for liquid mustard should be carried out immediately after blotting the lids.

b. If there is immediate severe eye pain, it is to be assumed that an arsenical is present and ointment BAL should be used at once, as directed for liquid lewisite. Visible droplets on the lids should be dabbed off if possible before BAL is applied.

Face and Respiratory Tract.

a. Decontaminate face as described.

b. Put on gas mask.

Skin.

a. Quickly blot all gross liquid from the skin.

b. Immediately apply ointment protective S-461 or S-330 to the contaminated areas as described for liquid mustard. Ointment should be kept out of the eyes.

c. Remove as much ointment, protective, as can be done quickly and apply ointment BAL to the same areas.

d. Remove this BAL and reapply fresh ointment which should be left on the skin.

e. Remove contaminated clothing and treat underlying skin possibly contaminated as above.

Other Gases

The chart will suffice for specific information relative to choking gases, tear gases, vomiting gases, systemic poisons, screening smokes, and incendiaries.

Personal Anti-Gas Equipment

Gas mask.
Anti-Dim.
Eye shield.
Protective covers.
Ointments.
Absorbent material.
Protective clothing.

Chapter III

SPECIAL DISEASES

Communicable Diseases

In this chapter will be discussed the symptoms, treatment, and methods for control of a number of diseases that may occur on board ship.

Communicable diseases are caused by animal and plant microorganisms which are communicated by man to man or by animals or insects to man. A person suffering with a communicable disease is said to be infected with that disease and for that reason the communicable diseases are often termed infectious diseases, and sometimes as infectious fevers.

In general, the communicable diseases are usually sudden in onset and may be classified as general infections which affect the body as a whole or as localized infections which primarily affect some particular system of the body, such as the skin, the lungs and respiratory passages, or the digestive organs.

Those diseases which affect the body as a whole are characterized by generalized symptoms, such as headache, fever, weakness, loss of appetite, chills, or a chilly sensation, and muscle aches and pains. Frequently these may be accompanied or followed by symptoms of a local nature such as sore throat, cough, or a skin rash.

Diseases which chiefly affect some particular system of the body usually also cause some generalized symptoms, such as those mentioned above, in addition to the localized symptoms of the infection. The differentiation between these two types of diseases depends upon whether the symptoms are predominantly general or local. In the course of an illness its type may change. For instance, an attack of influenza may localize as a pneumonia or an infected wound may develop into a general septicemia, commonly called blood poisoning.

Only by careful search for symptoms and observations of these symptoms during the progress of the illness can the correct diagnosis be made and the proper treatment be given.

The season of the year, the geographical location, and the environmental conditions are also factors to be considered in the diagnosis of an illness. For instance, dengue, malaria, and yellow fever are diseases transmitted by certain species of mosquitos. Consequently, these diseases may be found where mosquitos harboring these diseases are prevalent. Cholera, dysentery, and typhoid fever are often associated with defective sewage disposal and contaminated food and water supply. Typhus fever, plague and relapsing fever are, however, transmitted by insects and other

arthropods and are therefore more apt to be prevalent under conditions which make bathing of the body and washing of the clothes difficult or bring about exposure to the bite of rat fleas, mite larvae, or ticks.

When the body is invaded by the microorganisms of a disease there is a general disturbance of the health which is usually accompanied by a rise in the heat, or temperature, of the body that is known as fever. Fever may be continuously elevated for a period of several days, or it may vary upward and downward from time to time.

The termination of fevers occurs in one of two ways: By *crisis,* when it drops suddenly to normal or below, never again rising to any considerable extent unless there is a relapse or a complication sets in, or by *lysis,* when it gradually comes down to normal. Pneumonia, influenza, measles, and typhus fever are examples of diseases in which the fever terminates by crisis, most other fevers terminating by lysis.

Body temperature is measured by means of the clinical thermometer, a small glass cylinder, the center of which is a slender hollow tube dilated at its lower end into an oblong or round bulb and containing mercury. When heat is applied to the bulb the mercury expands and is forced as a silvery, thread-like line to a height in the tube depending on the amount of heat applied to the base. The front aspect of the glass tube is conical which, by the refraction of light, magnifies or broadens the image of the mercury column so that it is easily seen. On the tube is a scale which, in this country, is usually marked in degrees and tenths of degrees Fahrenheit, and ranges from 92° to 110°. To read the temperature the conical edge of the tube is held toward the reader, the thermometer is rotated slightly in the fingers until the flash of the magnified metallic column is seen, and then held in that position while the degree on the scale at the top of the column is read.

A special marking on the scale indicates the normal temperature of the human being, 98.6° F., and one should be familiar with its location. Before taking the temperature the mercury in the thermometer should always be below that mark, usually at about 95° F. To get the mercury below the normal mark hold the upper end of the thermometer firmly, but not stiffly, between the thumb and the first and second fingers of the hand, and, with the wrist relaxed, shake the mercury down by quick swings repeated as long as necessary.

Temperature taken by mouth is considered as the standard, but it may also be taken by rectum or in the armpit. When taken by rectum it is roughly 1° higher and in the armpit 1° lower than when taken by mouth. The thermometer should be left in the mouth about 3 minutes, in the rectum for 3 to 5 minutes, and in the armpit for 5 to 7 minutes before reading.

In taking temperature by mouth the thermometer is placed in a slant-

ing position in the mouth with the bulb under the tongue and the tube against the corner of the mouth, and the lips kept closed.

After use clean the thermometer in cold water (hot water will break it, immerse it for 20 minutes in 1–20 solution of carbolic acid, rinse in cold water and dry. Equally safe and much simpler is to provide a watertight case, keep it filled with 70% grain alcohol and return the thermometer after washing (with soap and cold water) to this disinfecting solution.

Before considering the communicable diseases separately it is necessary that certain matters pertaining to and terms employed in dealing with them be briefly discussed.

A *rash* is a temporary eruption that appears on the surface of the skin. It occurs most commonly in the following communicable diseases: Measles, German measles, chicken pox, scarlet fever, smallpox, cerebrospinal fever, typhoid fever, and typhus fever. In each of these diseases, the character of the rash and the time of its appearance are very important factors in making the diagnosis. In describing a rash the following terms are used:

A *papule* (or pimple) is a small, red, solid elevation of the skin.

A *macule* is a small spot of congested skin; it is larger and flatter than a papule. It is not elevated above the skin.

A *vesicle* is a small collection of serum under the skin; e.g., a water blister.

A *bulla* or *bleb* is a large blister.

A *pustule* is a small collection of pus under the skin, or an infected papule.

A *scab* is an irregular mass of dried serum or pus, usually brown in color.

A *scale* is a particle of dried skin that peels off.

CONTROL OF COMMUNICABLE DISEASES

In dealing with communicable or infectious diseases certain terms are frequently used and a few of them will be next explained.

Cleaning.—This term signifies the removal by scrubbing and washing, as with hot water, soap, and washing soda, of organic matter on which and in which germs may find favorable conditions for living; also the removal, by the same means, of germs adherent to surfaces.

Contact.—A "contact" is any person or animal known to have been sufficiently near to an infected person or animal to have been presumably exposed to the transfer of infectious material directly or by articles freshly soiled with such material.

Incubation period.—This is the period of time which elapses between

the date of infection with a communicable disease and the appearance of the first symptoms of the disease. During this period the germs of the disease are growing and multiplying in the body.

Isolation.—This is the period of time during which a patient suffering with a communicable disease is kept by himself and separated from others in order to prevent the conveyance of infectious material to them.

Quarantine.—This is the time during which the freedom of movement of apparently healthy persons who have been exposed to communicable diseases is restricted and they are kept under observation to see if they develop the disease to which they have been exposed. The period of quarantine is generally 2 or 3 days longer than the incubation period. This term is also applied to animals and plants.

Spread of Infection

The infection of communicable diseases is spread or transmitted in various ways—by actual contact, by the air (droplets of saliva or germ-carrying dust), food, or drink, clothing, books, utensils, insects, etc. The most infectious part of a patient may be discharges from the mouth, throat, nose, or ears, the urine, or the feces.

Prevention of Spread of Infection

1. *Isolation.*—As soon as a case is suspected of being infectious the patient should be kept away from other persons. On board ship any suitable place may be employed, such as a spare cabin, chain locker, a boat roofed over with tarpaulin, any compartment which can be afterwards thoroughly disinfected and where the individual will not come in contact with the rest of the crew. The patient should be sent to a hospital as soon as the proper authority has been obtained from the quarantine officer of the port or other person authorized to land him. The person detailed to attend an infectious case must not mingle with other people. The patient must have his own separate utensils—cup, plate, knife, fork, spoon, etc., and use a commode and urinal instead of the general head. Isolation must be complete, so that there is no possible way by which infection can be carried to others.

2. *Disinfection.*—By disinfection is meant the killing of the germs of the disease. This is carried out by heat, by chemicals, or by fresh air and sunlight.

Disinfection by heat: Boiling in water is the best and surest method of disinfection, but it cannot, of course, be used for every infected article. For bedding and clothing a steam disinfector is used. Habitual disinfection of the mess gear of all the crew by boiling water should be meticulously observed after each meal and particularly upon the appear-

ance of a communicable disease. (See also chapter on Quarantine and Disinfection; and instructions under specific diseases.)

3. *Disinfesting.*—By disinfesting is meant any process, such as the use of dry or moist heat, gaseous agents, poisoned food, trapping, etc., by which insects and animals known to be capable of conveying or transmitting infection may be destroyed.

4. *Fumigation.*—By fumigation is meant a process by which the destruction of insects, as mosquitos and body lice, and of animals, as rats, is accomplished by the employment of gaseous agents.

TREATMENT OF COMMUNICABLE DISEASES

The fundamental principles of the treatment of communicable diseases are:

Rest.—Should be actual rest, in a comfortable bed, placed in a quiet, warm, well-ventilated compartment, and every means exercised to relieve the patient from anxiety and concern, and to promote sleep.

Fluids.—As a general rule, clear liquids, such as water, tea, coffee, carbonated beverages, lemonade, fruit juices and the like should be given to a patient with fever. It should be insisted that he drink from 2 to 5 quarts (depending on the height of the fever) for each 24 hour period, unless he is vomiting or there is some other good reason for his refusal to take the desired amounts. It is not necessary to wait for his request because frequently there is a mild delirium, and the patient's state of mind will not cause him to ask for water though he needs it in abundance to keep the bowels and kidneys and skin active.

Diet.—Should be as desired or tolerated by the patient. Ordinarily this will be liquid or semisolid, such as milk, raw or soft boiled eggs, tapioca, cornstarch; chicken, beef, or mutton broths seasoned and thickened with rice. Food should not be urged, in the early hours or days of a disease, against the patient's disinclination to take food. However, when the patient has lost his aversion for food, it should be appreciated and the appetite catered to as far as may be consistently done, keeping in mind the general diet of liquids or semisolids as given before.

FRESH AIR.—Means of supplying abundant fresh air, preferably cold air, should be provided. Care should be used in making sure that the patient is kept warm and is not exposed to direct drafts of cold air by the abundant supply of air provided.

HYDROTHERAPY.—Ordinary personal cleanliness requires that a patient receive a bath every day, if possible. This is particularly true in the case of patients who have sweats and fever. Sponge baths of tepid water (98°-100° F.) may be given occasionally to bring down a high temperature (over 104° F. orally), and to add to the comfort of the

patient. Care should be exercised not to expose the patient to cold air during this procedure.

DRUGS.—Treatment should be carried out primarily to ease the patient's complaints of pain, headache, itching, etc. In the outline of treatment of each disease directions will be given for any specific treatments which may be indicated.

SULFANILAMIDE, SULFADIAZINE, and related drugs.—These medicines are provided in 7.7 grain (0.5 gram) and 15 grain (1.0 gram) tablets as well as in powder form. They are of great value in the treatment of certain diseases, such as pneumonia, meningitis, gonorrhea, blood poisoning and the like. The powder is used in the local treatment of wounds and compound fractures.

Indiscriminate use of these drugs is *dangerous*. Under ordinary circumstances when their use is indicated, 1 or 2 tablets (0.5-1.0 gram), depending on the size of the tablets available and on the dose recommended, is given with ½ teaspoonful of soda bicarbonate every 4 hours, a day and night until the patient is well. Unless it is impossible to obtain medical care, do not continue the use of these drugs for more than 5 days without medical consultation.

Certain precautions must be taken when a patient is taking one of the Sulfanilamide group:

1. Fluids must be drunk daily to the total of 3–3½ quarts (12–15 full glasses) and the urine output must be maintained at 1–2 pints or more in each 24 hours.

2. Patients should not be permitted to carry on any duties which require use of judgment.

3. Nausea, vomiting, and cyanosis (blue lips and finger nails) are annoying, but are not important.

4. If the patient develops a rash or sore eyes, becomes delirious, jaundiced (yellow skin), if he feels weak *and* has a very pale tongue, if his fever becomes worse, or if he has pains in his sides like kidney colic and his urine is red and smoky, stop the medicine and force fluids.

Careful nursing is an essential in the treatment of all disease; and while it is not to be expected that the nursing available on board ships, to which no member of the medical department is attached, will be as efficient as that which may be had from persons trained in the art of nursing, much may be done to aid the sick if attention is given to providing for their wants and promoting their comfort. A sick man should have a man detailed to wait on him and watch him. This makes rest possible for the patient. Fever patients often are delirious, and, if not watched, may injure themselves, jump overboard, etc.

Keeping the patient's face, hands, and body clean and the nose and mouth clear and moistened (a little glycerine and water, to which may be

added a little lemon juice or a small pinch of soda, is useful to wet the lips, tongue, and inside of cheeks) makes him feel fresher and renders him better able to combat the germs and toxins of disease.

Instructions for the Person Nursing a Communicable-Disease Patient

1. Wash your hands as soon as possible after touching the patient, his clothing, or bedding, also after handling the bedpan, urinal, thermometer, etc.
2. Wash your hands carefully before eating your meals.
3. Never use cups, plates, spoons, knives, forks, etc., which have been used by the patient. Keep your own utensils in a separate place so that you will know that you are always using the same articles.
4. See that your patient does not come in contact with the other people of the ship.
5. On no account are you yourself allowed to mingle with others of the crew, etc.
6. Never eat your meals with the patient.
7. Wear white clothes, as these can be washed and boiled more easily.
8. When it is suspected that the patient carries infection in his nose and throat avoid as far as possible direct exposure to his cough spray and talk spray and wear a gauze mask over the mouth and nose when obliged to be in close proximity to the patient's face.

GENERAL INFECTIONS

INFLUENZA (GRIP)

Symptoms.—Incubation period—short, usually 24 to 72 hours. The onset is fairly sudden with fever and signs of bad cold, but the patient feels much more ill than with an ordinary cold, and has severe prostration and pains in the back, limbs, and head. In some forms, the lungs are chiefly affected and pneumonia or bronchitis may complicate the disease. In others, the heart may suffer, causing palpitation and difficult breathing; while in others, again, diarrhea cramps and vomiting may be the chief symptoms. The acute illness usually lasts about a week but convalescence may be very prolonged and complicated.

Treatment.—Keep the patient in bed and force fluids by mouth. Give 1-2 tablets (5-10 grains) of aspirin every 4 hours when patient is awake. One teaspoonful of salt to a pint of warm water makes a good gargle for use when there is a sore throat. A teaspoonful of Brown Mixture every 3 hours will help the cough.

METHODS OF CONTROL.—*Isolation.*—During acute stage of the disease, especially in severe cases and those complicated by pneumonia.

Quarantine.—None, but visiting the patient should be discouraged.

General measures.—Disinfect discharges from the nose and throat of the patient. Avoid the crowding of beds. Discourage the congregating of crowds.

CHICKENPOX

SYMPTOMS.—Incubation period—2 to 3 weeks. The rash appears on the first day of the illness and consists of vesicles, which dry and form scabs. The vesicles come out in crops, mostly on the trunk, face, and scalp and only a few on the limbs. There is usually very slight fever, and the patient does not feel very ill. The vesicles may be so few as to escape observation.

TREATMENT.—Put to bed if there is fever, otherwise not necessary. No change in diet unless patient is unable to swallow solids. Give water freely. For itching, wash parts gently with a solution of sodium bicarbonate, 1 tablespoonful to a pint of water. Keep mouth clean with alkaline and aromatic solution.

METHODS OF CONTROL.—*Isolation.*—Avoidance of contact with non-immune persons should be made effective until all pustules are gone.

Quarantine.—None. Contacts who have not already had the disease should be observed daily for a period of 21 days following last day of contact.

General measures.—Disinfection of articles soiled by discharges from lesions. Investigate source of infection (may be mistaken for smallpox). Thorough cleaning of compartment after recovery or removal of patient.

SMALLPOX

SYMPTOMS.—Incubation period—8 to 16 days, commonly 12 days. The beginning is usually sudden with a chill, headache, and pain in the back. The headache and backache are very severe and quite characteristic. The temperature may rise rapidly to 103° or 104° F. The eruption commonly appears 1 to 5 days after the onset of fever on the forehead, scalp, forearms, legs, and trunk. At first the eruption consists of papules which are small and red and feel like shot under the skin. About the sixth day, the papules become vesicles; about the eighth day, pustules, and about the tenth day scabs form, which in time fall off, leaving, finally, deep white pitted scars. When the papules appear, the temperature tends to fall but rises again when the pustules are forming. The patient's skin has usually a very foul odor. The severity of the disease may vary from a mild form, with a few discrete pustules, to a severe form with hemorrhages into the skin, which is often fatal in 1 to 2 days.

TREATMENT.—Treatment is to be directed primarily toward making the patient as comfortable as possible, and yet preventing any of the complications. Food should be liquid or soft and easily digestible. Feeding may become difficult, owing to the condition of the mouth; therefore, special attention should be given to mouth washes and care of the lips with vaseline or mineral oil from the onset of the disease. Fluids should be given frequently, to the extent of 3–5 quarts daily, in order to prevent the patient from becoming "dried out," and in order to maintain satisfactory urine output (at least 1 quart in every 24 hour period). In order to relieve the itching and to prevent increased scarring, scratching should be prevented and the eruption should be covered with some oily dressing, such as vaseline, or with cold-water compresses covered with oiled silk or muslin. An arrangement to relieve the patient of the weight of bedclothes is often necessary. Aspirin, 2 tablets (gr. 10), and phenobarbital 1 tablet (gr. 1½) may be given 2–4 times a day to make patient more comfortable. The eyes may be washed with borax eye solution (See Diseases of the Eye). Delirium is common and the patient must be carefully watched. Report the suspected case by radio if possible.

METHODS OF CONTROL.—*Isolation.*—Strict isolation in screened quarters until period of infectivity (disappearance of all scabs and crusts), is passed.

Quarantine.—All members of the crew should be kept aboard and no visitors should be permitted aboard until (*a*) all members of the crew have been revaccinated and the height of the vaccination reaction has passed or (*b*) 16 days have elapsed since the first case and no new cases have developed. See chapter IX, page 143 for measures to be taken upon arrival at port with a case of smallpox aboard.

General measures.—Disinfection of all articles before leaving surroundings of patient. Thorough cleaning and disinfection of compartment after recovery or removal of patient. In all cases of smallpox, every effort should be made to obtain medical assistance and the earliest vaccination of all members of the crew, regardless of exposure, is necessary. Investigate the source of infection as many cases of chicken pox are mistaken for smallpox.

MEASLES

SYMPTOMS.—Incubation period—8 to 14 days. The disease commonly commences like a common cold, with sneezing, running of the eyes and nose, headache, cough, and slight fever. On the fourth day the rash appears on the face and thence spreads downward to the neck, chest, abdomen, and limbs. It consists of dull, red macules which run together, forming various patterns and lasts about 3 days. The lining of the

mouth and throat appears of the same red color, dotted by minute white spots which appear before the skin eruption and are diagnostic of measles. The temperature falls as a rule at the end of the fifth day and the symptoms disappear, but the cough may remain for some time.

TREATMENT.—The patient is usually quite uncomfortable because of his annoying cough, his sore eyes, his fever and his itching. Brown mixture (1 teaspoonful), a darkened and quiet room, aspirin, 1-2 tablets (gr. 5-10) 2-3 times a day, and soda bicarbonate solution for the skin (see Chicken Pox) will often be of help. Otherwise care is quite general. Guard against chilling and exposure, as pneumonia is a serious and often fatal complication. If pneumonia develops, sulfadiazine, 2 tablets (15 grains) every 4 hours day and night is to be given until patient is well or medical help has been obtained. (See discussion of Sulfa-drugs, page 72.) Reading should be prohibited while patient's eyes are inflamed.

METHODS OF CONTROL.—*Isolation.*—During period of serious catarrhal symptoms, a minimum period of 5 days from the bginning of the rash.

Quarantine.—None.—Contacts who have not already had the disease should be observed daily for 14 days.

General measures.—Disinfection of all articles which have been in contact with patient and all articles soiled by his discharges. Thorough cleaning of compartment after recovery or removal of patient. Investigation of source of infection.

GERMAN MEASLES

SYMPTOMS.—Incubation period—14 to 21 days, usually about 16 days. These symptoms are usually very mild, consisting of sore throat, headache, very mild fever, lasting only a day or two, and enlargement of the glands of the neck. The rash appears on the third or fourth day on the face and chest, spreading to the trunk and limbs; consists of red papules larger and duller than in scarlet fever, smaller and brighter than in measles, and lasts about two days.

TREATMENT.—Along general lines. Beyond keeping the patient isolated for a few days and avoiding a chill, no treatment is usually necessary.

METHODS OF CONTROL.—*Isolation.*—Until catarrhal symptoms and rash disappear.

Quarantine.—None. Non-immune contacts of first cases should be observed daily for 21 days. Observation of contacts when the disease is epidemic is probably futile.

General Measures.—Disinfection of discharges from nose and throat of patient and articles soiled by discharges. Airing and cleaning of compartment after recovery or removal of patient. Investigate source of infection (may be mistaken for scarlet fever in early stages).

SCARLET FEVER

Symptoms.—Incubation period—2 to 7 days, usually 3 to 4 days. Symptoms come on suddenly, the most marked being fever and sore throat with nausea and vomiting. The rash appears on the second or third day and consists of bright red papules set very close together, which gives the skin its scarlet hue. It is seen first on the neck and then spreads to the chest, arms, abdomen, and legs. It is usually most marked on the neck, the flanks, the buttocks, the bend of the elbows, and on the inner side of the thighs and knees, but may not appear on the face in mild cases. It usually lasts about 5 days. The throat remains sore for some days, the tonsils are red and swollen and often covered with yellow patches. The tongue is at first coverd with white fur through which the red papillae show, giving it the appearance of a strawberry. Later when the fur disappears, the tongue becomes very red. The fever is usually high and lasts about a week and may cause some flushing of the face, which must not be mistaken for the rash. Desquamation, or peeling of the skin, commences as the rash disappears and is first noticed on those parts of the body where the rash was most marked. It commences as small white spots in the center of which holes appear. From this center, circular scales separate. This pinhole peeling is characteristic of scarlet fever. The scales may be small or may come away in large flakes. The last parts to peel are the palms of the hands and the soles of the feet.

The complications of scarlet fever are to be feared. The commonest of these are discharging ears, swollen and discharging glands in the neck, and kidney involvement (passage of blood in the urine).

Treatment.—Patient should receive treatment designed to make him more comfortable, and to prevent complications as far as possible. He should be kept in bed from 2 to 3 weeks, and when first allowed up, his exercise should be limited to a few minutes at a time. Diet will depend on patient's appetite, but fluids must be taken to a total of no less than 3 quarts a day. Gargles and mouth washes should be given at least every 3 hours when the patient is awake. (A good gargle can be made by dissolving 1 teaspoonful of ordinary table salt in a pint of luke-warm water, or by using alkaline and aromatic solution). Aspirin, 2 tablets, (gr. 10) and phenobarbital, 1 tablet (gr. 1½) may be given several times a day for discomfort and restlessness. Wet, cold cloths are sometimes useful applications to the neck and throat for relieving pain. It is advisable to give sulfadiazine, 1 tablet (gr. 7.7), and sodium bicarbonate, ½ teaspoonful, 4 times a day until patient is seen by a medical officer. If complications are observed, treatment of symptoms should continue. To allay itching and when the skin commences to peel, the patient may be rubbed with olive oil or a simple ointment or a daily hot bath may be

given. The infection is most potent in the secretions of the nose and throat during the first 5 days of the disease.

METHODS OF CONTROL.—*Isolation.*—If medical inspection is not available, isolation for 21 days from onset for uncomplicated cases, longer if abnormal discharges continue.

Quarantine.—None. Non-immune contacts should be given 1 gram (15 grains) of sulfadiazine daily and observed daily for one week. Such contacts should be excluded from food handling for 1 week.

General measures.—Disinfection of all articles which have been in contact with patient and all articles soiled by his discharges. Thorough cleaning of compartment after recovery or removal of patient. Investigation of source of infection (carrier).

MUMPS

SYMPTOMS.—Incubation period—12 to 26 days, most commonly 18 days. The patient complains of pain and stiffness on moving the lower jaw, and there will be swelling of one or more of the salivary glands. His temperature is raised, often to 104° F. The fever lasts about a week and the swelling about 10 days. Orchitis, or inflammation of the testicles, is very liable to occur in about 25 percent of cases at the end of the first week. The temperature rises rapidly and the testicle is found to be painful, tender, and swollen. This condition does not usually last more than a week but is very painful and usually results in atrophy of the affected testicle, and possible sterility, if both testicles are affected, sterility may result.

TREATMENT.—Along general lines. Isolate the patient, keep the bowels well open, and for the pain, hot water bags may be used applied to the swelling. Strict bed treatment and avoidance of exercise and chilling is absolutely necessary to avoid complications. If orchitis occurs the testicles should be supported by a suspensory bandage or a broad strip of adhesive plaster, with gauge or cotton between testicles and support, applied across the upper part of the thighs in such a manner that the testicles will be thoroughly supported. The ice bag should be applied to relieve the pain and the bowels freely opened with Epsom salt—2 tablespoonfuls dissolved in water.

METHODS OF CONTROL.—*Isolation.*—Until all swelling has subsided. Patient should be kept in bed one week after swelling about jaws has subsided in order to avert occurrence of orchitis.

Quarantine.—None. All contacts, however, should be inspected daily for a period of 3 weeks from date of last exposure.

General measures.—Disinfect all articles soiled by discharges of nose and throat of patient. Investigate source of infection (e. g., recent cases of swollen jaw or orchitis).

MALARIA

SYMPTOMS.—Incubation period—usually 14 days in the tertian variety. This is a recurrent fever caused by malarial parasites which are carried by certain anopheline mosquitoes and injected into the body when the insects bite. The disease is not infectious except through the bite of a mosquito which has bitten malaria patients or carriers at some time during its life. The disease consists in attacks of fever which recur at regular intervals. Each attack may be divided into three stages: (1) The cold stage: The patient shivers and feels cold when his temperature is rapidly rising. He goes to bed and covers himself with extra blankets. This stage lasts about half an hour. (2) The hot stage: He begins to feel warm and removes most of the bed clothes. The skin feels hot and dry, and he suffers from severe headache. The temperature will now be elevated and in some cases may reach 105° F. or higher. This stage lasts 3 or 4 hours. (3) The sweating stage: During this stage the patient perspires freely, the headache and flush disappear, and the temperature returns to normal. This stage lasts about 2 hours. These attacks occur every day, every other day, or every third day, according to the species of malarial parasite with which infected, and each lasts about 6 hours. There are other types of malaria in which the fever is continuous, and somewhat resembles the fever of typhoid.

TREATMENT.—Quinine, 5 tablets, (15 grains) should be given three times a day for 2 days and then, 3 tablets, (9 grains) three times a day for the next 5 days. If chills and fever begin again, the same dosage should be repeated. (If Atabrine is available, the dosage is 2 tablets (gr. 3) every 6 hours for 5 doses followed by 1 tablet (gr. 1½) three times a day for 6 days. This should *not* be repeated for at least 1 week). Diet will be as tolerated. Fluids should be forced at least 3 quarts a day. Patients are often restless and sometimes disoriented, so they should be watched. During a chill, patients should be given extra blankets, even though the weather is quite warm, and care should be taken not to permit too rapid exposure at the time of the sweating. If hot water bottles are used, care must be exercised not to burn patient. (105°–110° F. is sufficiently warm and does *not feel hot*). Frequent sponges and baths will be required by the sweating. Mouth cleanliness should be watched. Aspirin, 2 tablets, (gr. 10) may be used every 3 or 4 hours for headache and discomfort.

METHODS OF CONTROL.—*Isolation.*—The individual with malarial parasites in his blood should be protected from the bites of mosquitoes. With the exception of this simple precaution, isolation and quarantine are of no avail.

Quarantine.—None. (See Isolation.)

General measures.—The malarial mosquito bites preferably at dusk or at night, therefore when in malarial countries everyone should sleep un-

der mosquito nets. Suppressive (preventive) treatment should not be started without consultation with a naval medical officer or one of the naval malaria-control units which have been set up in many malarious areas. Advice as to the use of repellent and as to the destruction of all possible breeding places for mosquitoes aboard should be obtained from the same sources.

DENGUE

SYMPTOMS.—Incubation period—3 to 15 days, most often 7 or 9 days. Sudden onset, intense headache, joint and muscle pains (breakbone fever), and irregular eruption.

TREATMENT.—Treat the symptoms. Aspirin, 2–3 tablet (gr. 10–15), every 3–4 hours will make patient somewhat more comfortable. The patient will seem to get well for a day or 2 after 3 to 5 days of illness, but will become sick again for 1 or 2 days. Treatment during this second stage is the same. Diet will be as tolerated. Force fluids.

METHODS OF CONTROL.—*Isolation.*—The patient must be kept in a screened room.

Quarantine.—None.

General measures.—Protection against mosquitoes by means of screening and repellents and elimination of mosquitoes.

UNDULANT FEVER

SYMPTOMS.—Incubation period—6 to 30 days or more. Onset gradual with irregular fever of prolonged duration; profuse sweating, chilliness, pain in joints and muscles. This disease, also called Malta or Mediterranean fever, is transmitted from infected cattle and goats chiefly through unpasteurized milk or by direct contact with infected animals (including swine) or animal products.

TREATMENT.—On general lines. Patient will probably need prolonged care and should be hospitalized. Fluids and diet will be given as tolerated. Aspirin, 2 tablets, (gr. 10) 4 times a day will diminish fever and relieve pain.

METHODS OF CONTROL.—*Isolation.*—None.

Quarantine.—None.

General measures.—Pasteurization of milk, whether from cows or goats. Investigation of source of infection.

PLAGUE

See description under "Quarantine", chapter IX. This disease probably will not be encountered aboard naval vessels. It should be remembered that this disease is usually transmitted by rat fleas or by direct contact

with other cases. The best means of control, therefore, are by rat surveys and eradication.

If plague is encountered, give sulfadiazine (sulfathiazole is less effective but may be used when sulfadiazine is not available). Four (4) tablets (4.0 gms.) at once and then 1½ or 2 tablets (1.5–2.0 gms.) every 4 hours, day and night until temperature is normal. Continue with ½ tablet (0.5 gms.) every 4 hours at least 10–15 days after temperature is normal. One-half teaspoonful of soda bicarbonate should be given with each dose of tablets. Fluids should be given to the extent of at least 3½ quarts a day. Watch for any signs of Sulfadiazine poisoning.

YELLOW FEVER

Symptoms.—Incubation period—3 to 6 days, rarely longer. When a susceptible individual is bitten by an infected mosquito, there develops, after the period of incubation, a rapid rise of fever, with marked congestion of the face and severe pains of the back and head. Vomiting, first of mucus and bile, comes on very early. The temperature remains fairly high for 3 or 4 days, but notwithstanding the high temperature, the pulse rate becomes less, and by the third or fourth day will have decreased by 20 to 40 beats from its initial rate. This is a very important sign. On the fourth day the temperature falls and the face loses its congested appearance, and it is now that the most characteristic feature of yellow fever appears; namely, jaundice, a yellow discoloration of the skin, mucus membranes, eyeballs, and secretions. Vomiting of material resembling coffee grounds is common. This is an important epidemic disease of the West Coast of Africa. There has been no case of the urban type in North or Central America or the West Indies for many years. Outbreaks of the so-called jungle type have occurred in recent years in South America, in Colombia, Brazil, and Bolivia. The virus is contained in the blood of infected patients only during the first 3 days of the disease, and the disease is transmitted by the bite of a mosquito, *Aedes aëgypti* formerly known as *Stegomyia fasciata* or *calopus,* which has fed on the blood of an infected person about 12 days previously. As it is important to be able to recognize the mosquito, a brief description of it follows: The insect is almost black and has white bands on its back resembling a lyre or jew's harp, and the legs also have white bands. If deprived of water, the adult insect only lives about 5 days. It is essentially a house mosquito and rarely travels more than 75 feet from the house where it has been feeding, and it is probable that it is brought aboard ships in connection with coaling or provisioning rather than blown aboard by prevailing winds.

Treatment.—Fluids should be forced. Soda water (made by adding 1 teaspoonful of sodium bicarbonate (baking soda) to a quart of water and citrus fruit juices should be given to the total of at least 3 quarts daily.

Bed rest is essential and hospitalization should be brought about as soon as possible. Vomiting may be difficult to control, and if so, a retention enema (rectal installation) of the above mentioned soda water should be given not oftener than every 5–6 hours. As soon as possible, patient should be started on a light diet which is high in carbohydrate (fruit, starches, grains, cereals, etc.), but low in fat. Convalescence will be long.

METHODS OF CONTROL.—*Isolation.*—Necessary, during first 4 days of fever, in a mosquito-free room.

Quarantine.—None.

General measures.—Any receptacle, tank, double bottom, or other place where fresh water may be collected should be thoroughly screened and frequently inspected in order to prevent the breeding of mosquitos. Protection against mosquitoes by screening and repellents is essential. See Special Quarantine Measures, chapter IX.

SYSTEMIC DISEASES

DISEASES OF THE RESPIRATORY TRACT

COUGHS AND COLDS

When a person has a cough that lasts more than 2 weeks, even though the symptoms are mild, the case is serious enough to require an examination by a medical officer, which should be done at the first opportunity. A cold often marks the beginning of an acute infectious disease, such as measles, scarlet fever, etc.

SYMPTOMS.—A bad cold usually begins with a stuffed nose or an irritation in the throat, which gradually travels down the larger tubes. The cough is at first usually dry, but later it becomes loose and considerable mucus is raised. This sputum may at first be white and later yellowish. With this there will be soreness over the upper and front part of the chest, and if the cough is violent there will be considerable soreness of the muscles between the ribs.

TREATMENT.—Several nights of good sleep and drinking 3–4 quarts of fluids each day are about as satisfactory remedies for a cold as may be found. Aspirin, 2 tablets, (gr. 10) 4 times a day will relieve discomfort. Brown Mixture, 1 teaspoonful, at the same time is useful in relieving the cough. If sweating occurs, exposure should be avoided.

TONSILITIS (SORE THROAT)

All cases of tonsilitis and sore throat with fever should be promptly isolated because of the possibility of their being diphtheria, scarlet fever, etc., and the consequent possibility of an epidemic of that disease should such be the case.

SYMPTOMS.—Patient complains of rawness and difficulty in swallowing and the tonsils are swollen and red. There are headaches, general muscular and joint pains, and the fever is often high. Small beads of yellow pus are seen on the red, swollen tonsils, and in some cases abscesses may form. If there is a grayish-white tenacious membrane formed in the throat, which bleeds readily when touched, the case should be regarded as diphtheria and the individual promptly and completely isolated, and a medical officer consulted as soon as possible.

TREATMENT.—Bed rest is useful. Fluids (3–4 quarts a day) should be pushed. Warm salt water or alkaline and aromatic gargles (see Scarlet Fever) every 2 hours will relieve the sore throat. Liquid or soft diet is usually more acceptable than a heavy diet. Aspirin, 2 tablets, (gr. 10) will help relieve the discomfort.

PNEUMONIA

Pneumonia is an acute infectious disease which results in an inflammation of the lungs. It usually begins suddenly with a chill, followed by high fever (102°-104° F. or higher). Often there is a sharp pain in the chest (pleurisy), which is made worse by deep breathing and by the cough which regularly accompanies this disease. Rusty or prune juice colored sputum is coughed up. Breathing is rapid and shallow. Headache and prostration are common.

TREATMENT.—Bed rest in a ventilated but not drafty room is imperative. Sulfadiazine is almost specific for this disease. Give 8 tablets (4.0 grams) as the first dose and then 2 tablets (1.0 gram) with ½ teaspoonful of soda bicarbonate every 4 hours day and night, thereafter until patient's temperature has been below 99° F. for 72 hours. Force fluids to 3½ quarts a day. Watch for signs of sulfadiazine poisoning. Brown Mixture (2 teaspoonfuls) every 4 hours used for cough. Be careful not to expose patient when bathing him. Diet will be liquid or light.

METHODS OF CONTROL.—*Isolation.*—Until temperature returns to normal.

Quarantine.—None.

General measures.—Avoidance of overcrowding, chilling, and fatigue. Disinfect all articles soiled by nose and throat discharges of patient.

DIPHTHERIA

This is an acute infectious disease characterized by the formation of a membrane in the throat and on the tonsils and soft palate. It is caused by the diphtheria bacillus and all secretions from the nose and mouth are infectious.

SYMPTOMS.—Incubation period—usually 2 to 5 days, occasionally longer. Symptoms come on gradually with general indisposition, sore throat, headache, enlarged glands in neck, and moderate fever. There is a creamy-white deposit formed on the tonsils, which spreads to the uvula and soft palate. This membrane may form on other adjacent parts and block the breathing tubes, in which case there is great danger of asphyxia. In addition to the symptoms caused by blocking of the air passages by the formation of the membrane, the patient suffers greatly from an overwhelming intoxication due to the formation of a poison by the diphtheria bacilli located in the membrane.

TREATMENT.—Isolation of patient from rest of crew, and complete bed rest are essential. The disease may spread rapidly to other people, and sometimes causes rapidly fatal heart trouble in the patient. Serum (antitoxin) is available for this disease, and it will make the disease less severe, as well as remove the chance of the heart disease. Therefore, have the patient seen by a medical officer at the earliest possible moment. Warm saline gargles will ease the sore throat. Avoid having the patient cough into the face of the attendant, and require the attendant to wash his hands thoroughly each time after being near patient. Attendant should wear a gauze face mask while helping patient.

METHODS OF CONTROL.—*Isolation.*—Until released on advice of medical officer.

Quarantine.—All members of the crew should be kept aboard and no visitors should be permitted aboard until ship is released by medical officer.

General measures.—Disinfection of all articles which have been in contact with patient or soiled by his discharges. Thorough disinfection and airing of compartment after recovery or removal of patient. Immunization of susceptible contacts. Investigate source of infection (milk, carriers, and pasteurization of milk supply).

ACUTE ABDOMINAL CONDITIONS

The most common, serious, acute abdominal conditions are acute appendicitis, perforating ulcers of the stomach or duodenum, intestinal obstruction, gallstone colic, kidney stone colic, and poisoning by infected food or by other poisons. Pain and tenderness in the abdomen, general or localized or both, nausea and vomiting, and more or less shock are symptoms common to these conditions. All cases presenting symptoms of abdominal

pain or nausea and vomiting, particularly when associated with more or less shock, should be brought under the care of a medical officer as soon as possible. If patient will be seen by a medical officer within a few hours, morphine should not be given. If no medical aid is available and the pain is excruciating, one-half of one morphine syrette may be given, but should not be operated on in less than 6 hours.

One always should suspect more than ordinary indigestion or constipation if there is much prostration, shock, or elevated temperature, or if the symptoms persist for any length of time. Many a person suffering from acute appendicitis or obstruction of the bowel will ascribe the condition to something that has been eaten, but do not be deceived by such a statement. Get all the information possible as to how the attack started, history of previous attacks, and symptoms prior to the present attack, whether the patient has vomited blood or not, and when the bowels last moved; take the temperature and pulse rate; lay the patient flat with the abdomen bared and determine by gentle and careful palpation where the pain and tenderness are most marked.

ACUTE APPENDICITIS

SYMPTOMS.—Appendicitis is an inflammation of the appendix. A patient frequently complains for several days before the attack of indigestion, loss of appetite, constipation or diarrhea, and uneasiness in the abdomen, or the attack may come on suddenly. The pain may start in the pit of the stomach, then become generalized over the abdomen, and finally, after several hours, become localized in the right lower quadrant of the abdomen with marked tenderness on pressure and rigidity of muscles over that point. Vomiting generally comes on 3 or 4 hours after the beginning of the attack. The temperature may be subnormal from mild shock or be elevated to 100° or 101° F. In acute appendicitis the appendix becomes full of pus and the danger lies in its rupture with resulting peritonitis.

TREATMENT.—Place the patient under the care of a surgeon as soon as possible. Put patient to bed with head and shoulders somewhat elevated. Give nothing by mouth unless a medical officer will not be available for some time (12–24 hours), in which event small amounts of water may be given by mouth. An ice bag or a hot water bottle (whichever is more comfortable) may be placed over the appendix. Give sulfadiazine, 2 tablets, (gr. 15) every 4 hours. *Never give a cathartic to a person suspected of having acute appendicitis.*

ACUTE INTESTINAL OBSTRUCTION

SYMPTOMS.—In this condition, a loop of bowel becomes constricted, resulting in the inability of the intestinal contents to move beyond the point

of constriction and cutting off the blood supply to the loop of the bowel with resulting gangrene or death to that section of the bowel. This condition is followed by absorption of poisons from the intestine, peritonitis, and death if the condition is not relieved. Two very common ways for the bowel to become constricted are by means of adhesions within the abdomen and by a loop of bowel becoming strangulated in a hernia, or rupture, as it is commonly called. The symptoms are inability to pass gas or feces by the rectum, pain in the abdomen, vomiting becoming more and more frequent, and intense shock. The bowel will be distended above the point of constriction and be flat below that point. The bowel must be relieved of its constriction or death will ensue.

TREATMENT.—Place the patient under the care of a surgeon at the earliest possible moment. In the meantime, take the following measures: (1) If the obstruction is due to a strangulated hernia, and the case has not gone too far, put the patient in a hot tub with the thighs flexed in order to relax the inguinal ring, and exert gentle pressure over the tumor; (2) put the patient to bed, give a soap and water enema, and nothing by mouth. *Never give a person suspected of suffering from obstruction of the bowels a purgative.*

PERFORATED GASTRIC OR DUODENAL ULCER

SYMPTOMS.—Generally, though not always, a person suffering from perforated ulcer of the stomach or duodenum gives a long history of stomach trouble. Acute pain "in the pit of the stomach," associated with more or less shock, is suddenly felt. The pain is sudden and intensely violent, which is greatly increased by swallowing fluids, by vomiting, by turning the body, by coughing, by respiration, and by pressure. This pain may radiate throughout the abdomen, but the chief tenderness is in the region of the stomach. Vomiting occurs in about one-half the cases at the time of perforation. Shock may be severe following the perforation, but, as a rule, does not last long. A board-like rigidity of the muscles of the abdomen is present, and the temperature is usually normal or subnormal. The danger from perforated ulcer of the stomach or duodenum is peritonitis, due to the escape of stomach or duodenal contents into the peritoneal cavity.

TREATMENT.—Bring the patient under the care of the surgeon as soon as possible before peritonitis sets in; in the meantime, put the patient to bed, *give absolutely nothing by mouth,* and put an ice bag over the stomach; and treat shock if present.

GALLSTONE COLIC

SYMPTOMS.—Gallstone colic is due to the passage, or the attempt at passage, of a gallstone from the gallbladder to the intestines. Depending

on the location of the stones, a person with gallstones may or may not be jaundiced. The patient frequently gives a history of stomach trouble with or without jaundice and may give a history of previous gallstone colic. The colic consists of spasmodic, excruciating pain over the stomach and liver, radiating upward over the right half of the thorax, frequently up under the right shoulder blade. The patient is very nauseated, and usually vomits, and often the vomiting is violent. The abdomen is distended and a condition of collapse soon comes on. The respirations are shallow, the patient groans, cries out, or flings himself about the bed, often assuming strange contorted positions, trying to obtain relief, frequently holding one hand over the liver region. The duration of an attack is from 4 to 20 hours, although it may last much longer. The temperature is usually normal or subnormal.

TREATMENT.—Bring the patient under the care of a medical officer as soon as possible. In the meantime, place a hot-water bag over the liver at the lower border of the ribs.

KIDNEY STONE COLIC

SYMPTOMS.—This condition is due to a small stone from the kidney entering into the ureter, which it blocks, tears, or distends. The pain is gradual or sudden in onset, is fearful in intensity and runs from the lumbar region down the corresponding thigh and testicle and into the abdomen and back. There are nausea, vomiting, collapse, and sometimes unconsciousness or convulsions. Frequent attempts at urination result in pain but little urine. The urine is often smoky or red from injury to the ureter. After a time the pain vanishes, due to the stone falling back into the pelvis of the kidney or to its passing on into the bladder.

TREATMENT.—Bring the patient under the care of a medical officer as soon as possible. In the meantime, put patient to bed, give plenty of water by mouth to increase the flow of urine, place a hot-water bag on the affected side of the abdomen, and administer 1 syrette of morphine to relieve pain.

DISEASES OF THE INTESTINAL TRACT

COLIC

SYMPTOMS.—This is a term applied to abdominal pain occurring in paroxysms of varying degrees of severity. The pain is usually located in the region of the navel; that is, in the middle of the belly. Colic is often preceded by constipation and accompanied by vomiting. The causes are various and the pain often may be a symptom of serious trouble. For example, abdominal pain is almost always the first and most pronounced symptom of appendicitis, intestinal obstruction, perforating ulcers, gall-

stones, kidney stones, lead poisoning (painter's colic), and food poisoning. Besides being a symptom of these conditions, colic is most frequently due to overindulgence in food and drink.

TREATMENT.—Place the patient in bed and apply a hot-water bag to the abdomen, interposing a cloth between the bag and the skin or wrapping it in a towel to protect the skin from being burned or blistered. No food or drink should be allowed until the colic has subsided.

Never give a purgative or a cathartic to a person suspected of having appendicitis or intestinal obstruction and give absolutely nothing by mouth to a person suspected of having a perforated ulcer of the stomach or intestine, but bring him under the care of a medical officer at once.

An individual suffering with colic is vastly better off with nothing in the stomach and such a person can easily go without food for 2 or 3 days, but must have water, which should be given in small amounts. If the patient's bowels have not moved, an enema (injection into the rectum) consisting of a pint of warm water and soapsuds, should be given and repeated in half an hour if there has been no result.

After all pain has subsided, the patient may be given liquid or semisolid foods, such as clear soups, custards, milk, milk-toast, or soft-boiled eggs. This diet may be cautiously and gradually increased to solid foods as the pain and vomiting subside and do not return.

DIARRHEA

SYMPTOMS.—Frequent, watery and painful stools are often accompanied by loss of appetite, nausea, and sometimes vomiting and abdominal cramps. Commonly it is an acute condition caused by some inflammation or irritation of the intestine. It is one of the main symptoms of typhoid fever, cholera, and dysentery. It is termed simple diarrhea when it occurs independently of any definitely diagnosable disease. It may be caused by exposure to cold or by eating unripe and indigestible vegetables and fruits, or decomposed or improperly cooked meat, fish, and shell fish. Drinking large quantities of cold water when the body is overheated is a frequent cause.

TREATMENT.—The patient should be encouraged to take fluids by mouth to the extent of his ability. A hot-water bag should be applied to the abdomen and the patient kept at rest in bed.

While the diarrhea is acute, the less food taken the better. During convalescence he should be given salty soups to relieve muscle cramps incident to the loss of salt in the evacuation and he should be kept on a smooth, bland diet until all symptoms have disappeared. No medicine ordinarily should be given. Small quantities of soda bicarbonate, 10 grains or 15 grains, in a little hot water may be given three or four times a day.

FOOD POISONING

SYMPTOMS.—Sudden onset (usually 2 to 6 hours after the food has been eaten though may be as long as 72 hours) with violent diarrhea, vomiting, abdominal cramps, prostration, and dizziness, occurring usually in epidemic form. The severity of symptoms will vary with different individuals. In most cases the acute symptoms will be over in 12 to 24 hours, leaving for several days a marked weakness, loss of appetite, and abdominal discomfort. Recovery is usually complete in 48 hours.

Outbreaks are caused by bacterial contamination of foodstuffs that have been prepared and allowed to remain at room temperature for varying periods of time prior to being served. The most common foodstuffs are: Ham, other meats and meat mixtures; salads; milk and cream preparations such as cream puffs, custards, and pies.

TREATMENT.—Give water freely. The patient should be placed in bed and a hot water bottle applied to the abdomen. Food should be withheld until 24 hours after cessation of the acute symptoms. There should be a slow return to a full diet.

METHODS OF CONTROL.—*Isolation.*—Not Required.

Quarantine.—None.

General measures.—Sources of infection can be eliminated only by insuring freedom from disease and a high standard of personal hygiene in all food handlers (particularly in regard to the matter of washing their hands after visiting the toilet), by serving foodstuff promptly after its preparation, and by maintaining a high standard of sanitation in the galley and butcher shop. It is particularly important that persons with boils, or infected cuts or sores on their hands not be permitted to handle foods.

DYSENTERY

Dysentery, or bloody flux, as it is sometimes called, is an inflammation and ulceration of the large bowel caused by an infection.

It occurs in different degrees of severity and may be either acute or chronic. Its severest form is met with in tropical countries, where it frequently occurs in widespread endemics and may attack a whole ship's company.

It is caused by specific microorganisms which enter the system with contaminated food or drink.

SYMPTOMS.—The disease may begin suddenly or gradually. The first stools may be like those of ordinary diarrhea, and after a day or two, or maybe a few hours, the stools contain slime and blood. Later they may become shreddy and brownish or greenish in color. The patient complains of cramps and "colicky" pains in the belly, with a burning sensation in the rectum, accompanied by a feeling as if something must be expelled, and

a constant desire to go to stool. The number of bowel movements may be from 10 to 50 a day, or even 100, depending upon the severity of the case, but the quantity expelled with each movement may not exceed a teaspoonful.

TREATMENT.—Rest in bed is important. Keep the patient warm. Large amounts of fluids by mouth are required in order to replace those lost in the frequent bowel movements. Water with 1 teaspoonful of table salt to the pint is often very acceptable to these patients. Sulfadiazine, 2 tablets, (gr. 15) with ½ teaspoonful soda bicarbonate every 4 hours day and night will relieve the number of stools in many cases. Care should be taken not to permit any of the diarrheal or bloody bowel movement material to get onto the hands or into the mouth. Diet should be light.

In countries where dysentery is prevalent no fruit or uncooked vegetables should be allowed, and all foods, both cooked and uncooked, should be protected from flies, which carry the contagion. Nothing but distilled or boiled water should be used for drinking or cooking purposes.

TYPHOID FEVER

This important disease is now very rare in the naval service because of antityphoid inoculation used throughout the Navy.

SYMPTOMS.—These come on very gradually with loss of appetite, general indisposition, and headache; there may be also some cough, diarrhea, and bleeding from the nose.

It is a disease in which the fever lasts about 4 weeks. During the first week the temperature gradually rises until the beginning of the second week, when it reaches its height, and then continues until about the end of the third week, when it gradually begins to fall, ending by lysis at the end of the fourth week.

The rash appears on about the seventh day on the abdomen, back, and lower part of the chest. It consists of fairly large, raised rosespots, which fade on pressure. They are usually few in number and come out in crops. Each spot lasts about 4 days and the rash lasts about 14 days. As the fever progresses the patient becomes very weak; he loses weight; his cheeks are slightly flushed; he is drowsy; and he is not capable of any exertion. He suffers from thirst; unless carefully attended, his lips and teeth become covered with scabs and crusts. Delirium is common.

TREATMENT.—*Along general lines.*—The patient needs careful nursing and should be removed to a hospital at the very first opportunity. When the fever is high, sponge baths should be given both night and morning, or oftener if necessary. Careful feeding is quite necessary in the treatment of typhoid fever. The chief articles of diet in typhoid fever are: milk, cream, well-cooked cereals, such as rice, grits, cream of wheat, strained oatmeal, etc.; soft boiled, soft poached, hard boiled or soft scrambled eggs; toast or

crackers; fruit juices; stewed apples, peaches, or apricots, apple float, butter, soups thickened with rice or barley flour, creamed soups, mashed or baked potatoes, scraped meats or finely minced meat. Simple desserts such as boiled custard, ice cream, bread or tapioca pudding, junket, cup custard, blanc mange, eggnog, and jellies are allowed. Food should be given a little at a time and at frequent intervals—2 or 3 hours.

Drugs are of little use. The patient must be carefully watched and all his wants given attention. Diarrhea is rather common at first. Later on, if there is constipation move bowels by enemas, not by cathartics.

METHOD OF CONTROL.—*Isolation.*—In fly-proof compartment. Release from isolation should be determined by a medical officer.

Quarantine.—None.

General measures.—Disinfection of all bowel and urinary discharges and articles soiled by them. Dishes and soiled linen should be boiled. Thorough cleaning of compartment after recovery or removal of patient. Immunize all members of crew, who are not protected. Investigate source of infection (water, milk, shellfish, and other food supplies), and carriers of the disease. Serve no raw milk or food until sure of its safety. Eliminate flies.

The germ of the disease enters the body through the mouth in infected foods or drinks, of which water and milk are the commonest, and, after that, food contaminated by flies, thus showing the importance of protecting all foods, both cooked and uncooked, from flies.

CHOLERA (ASIATIC)

An acute diarrheal disease transmitted by food, flies, water, and contact with infected persons.

SYMPTOMS.—Sudden onset with headache, prostration, diarrhea, and colic; later vomiting, purging, high fever, cold, clammy, shrunken and livid skin, rapid wasting of body, thirst, muscular cramps, watery (rice water) stools, with collapse.

TREATMENT.—Isolation, absolute quiet, application of external heat. Force fluids if possible. See a doctor immediately. (See dysentery.)

METHODS OF CONTROL.—*Isolation.*—In hospital or screened room during period of communicability, usually 7 to 14 days.

Quarantine.—Until stools are negative; contacts for 5 days from last exposure, or longer if the stools are found to contain the cholera vibrio.

General measures.—Thorough disinfection of all discharges from the bowels and vomited matter. Investigate source of infection. Use only boiled water and cooked foods and protect against flies and human handling. Immunization of contacts by vaccine, and of all personnel in presence of an epidemic. (See Special Quarantine Measures, Chapter IX.)

Diseases of the Skin

THE ITCH (SCABIES)

This is an itching disease (known as the "7 years' itch," etc.) found among people living in unclean surroundings and habits. The cause of scabies is the itch mite. It is therefore a contagious disease and may be passed from one to the other by close contact. The itch mite travels from one patient to another through the medium of the clothing, the towels, the bed clothing, personal articles, etc. The most common way of passing the disease from one to another is in having two or more persons using the same bed and same clothing.

Treatment.—All clothing and bedding belonging to or used by the patient which has been in contact with the skin, whether freshly laundered or soiled, such as underwear, pajamas, and socks, should be collected and sterilized by heat (steam or boiling water). Woolen clothing may be sterilized by thorough steaming with a hot iron and wet cloth as in pressing, or may be dry-cleaned. Before retiring, the patient should take a hot bath with plenty of soap. The surface of the skin, particularly in the vicinity of the eruption should be thoroughly scrubbed. Following this bath, an ointment consisting of sulfur and lard, commonly known as the official sulfur ointment (in Medicine Box) in the proportions of about 1 teaspoonful of sulfur to 1 ounce of lard, is now rubbed thoroughly into the skin from the collarbone entirely over the body to the soles of the feet, particularly in the vicinity of the eruption between the fingers, between the toes, and in the folds. There is no occasion to apply the ointments above the collarbone, as the disease seldom attacks that portion of the body. Whenever an application of sulfur ointment is applied at night, a hot bath with much soap must be taken the next morning. The sulfur-ointment application should be repeated once a day preferably just before retiring until the eruption and itching have subsided, when it may be assumed that the patient has been cured. All clothing used by the patient during the preceding 24 hours should be collected each day and sterilized. The patient may use two sets of clothing, underwear, socks, pajamas, sheets, etc., changing each day and sterilizing that worn or used the day before. Laundering each day is desirable but not necessary. Should the eruption continue and the itching remain unabated, a second series of treatments as described should be given. Too long an application of these treatments, however, is not advisable as the sulfur tends to cause an irritation of the skin which may cover up the scabies. If the skin gets very rough and generally red from irritation, limit treatment to anointing the body with vaseline or zinc ointment.

Any locker or other place used by the patient in storing clothes, should be disinfected with the Navy standard insecticide. This may not be used

in treatment, however, as actual contact is required and the insects like termites, being within the layers of the patient's skin, cannot be reached.

RINGWORM

This is a highly infectious disease of widespread prevalence, particularly in the Tropics and subtropics and during a hot, humid summer in the temperate zone. In adults it affects all parts of the body, though rarely the scalp: On the face it is commonly called "barber's itch," in the crotch "dhobie itch," or "jock-strap itch," and on the feet "athlete's foot." The cause is an infection with a fungus or mould. When well developed, it tends to form circles (ringworm) or parts of circles. Itching is a prominent symptom. In some cases, concentric circles develop or rings form upon one another, making various patterns. The spreading border is red or reddish and more scaly than the central portion which may appear normal to the unaided eye. It may begin as a few or numerous small red patches with scaling vesicles and crusts. It may be transferred from one part of the body to another by scratching the bare skin.

TREATMENT.—The fungus is very partial to dark, damp places, such as swimming pools, wash and bath rooms, and the inner recesses of deck swabs. As the infection frequently starts on the feet, members of the crew as well as the patient should be advised not to go barefooted but to wear some sort of a sandal, particularly in going to and from the shower, and to dry the toes thoroughly after bathing. Maceration of the skin in hot, moist weather favors spread. After bathing and while wearing shoes, the use of a good antiseptic powder on the feet and between the toes is advised. Such a powder, which may be obtained at any naval medical activity, consists of: Salicylic acid, 5 gm., menthol, 2 gm., camphor, 8 gm., boric acid, 50 gm., and starch, 35 gm. It may also be used in the treatment of the disease. The floors of shower baths, washrooms, etc., should be swabbed daily and mops should be dried in the sunshine. The patient should see a medical officer. The more intractible cases may require extended medical treatment.

LICE (VERMIN)

There are three forms of lice, which vary in size and somewhat in appearance.

The condition is contagious, as these parasites can be conveyed from one person to another through the medium of comb and brush, using the same bed and sleeping clothes, the use of the same outer garments, the presence of the vermin within the quarters inhabited by all the crew, and in other ways. The eggs are attached to the hairs by a covering which is soluble in acids such as vinegar (acetic acid).

The irritated appearance of the skin is caused largely by scratch marks. The main symptom is that of itching.

The scalp.—Little lumps are seen along the shafts and at the ends of the hairs. These are the nits or eggs of the parasite. The hair should be cut short. Thoroughly anoint scalp with vaseline or mild mercurial ointment which should be left on for about 1 hour. Then scrub head with soap and water and comb with a fine-tooth comb wet with vinegar. The egg cases or "nits" are soluble in acids and the vinegar tends to dissolve or destroy them. This treatment should be repeated in 3 or 4 days in order to "mop up" any remaining "nits" or adults that may have escaped the first treatment.

The genitals.—The louse which lives in the hair around the genitals is a small, round parasite commonly known as the crab louse. It deposits nits upon the hair, as does the louse of the scalp. In treating the crab louse it is first necessary to trim the hairs short around the genitals and to cut the hairs in the arm pits where there is a possibility of the infection spreading. The area is thoroughly scrubbed with soap and water and a thin coating of vaseline or mild mercurial ointment thoroughly rubbed in and allowed to remain for 24 hours. These areas are then scrubbed again with more soap and water and ordinary table vinegar is applied several times during the day. This treatment must be repeated a day or two later.

The body.—The body louse is the largest of the three varieties. It inhabits the clothing of the patient and usually seeks the seams of garments. The treatment consists of changing the entire outer and under clothing after taking a bath and scrubbing the person thoroughly with a liquid soap. Infected clothing should be boiled. The patient's mattress cover and blankets should likewise be disinfected, preferably by heat.

Diseases of the Nervous System

HEADACHE

Headache is a symptom of disease of some part of the body. It generally accompanies the acute fevers, is associated with constipation, disorders of the stomach, liver, kidneys, and genital organs. Eye strain is a frequent cause.

Treatment.—Remove the cause if possible. Open the bowels with a dose of castor oil or Epsom salt and give 10 grains of aspirin or 5 grains of phenacetin, and repeat in 3 hours if necessary. A little hot tea and toast should be given with this medicine to prevent nausea. A medical officer should be consulted if this does not benefit the patient.

CEREBROSPINAL FEVER (MENINGITIS)

SYMPTOMS.—Incubation priod—2 to 10 days, commonly 7. Onset is sudden with symptoms of an acute cold, fever, headache which may be almost unbearable, nausea, rigidity of neck and insomnia followed by delirium or coma. In some cases marked drowsiness and headache and presence of an acute cold are the only symptoms. Frequently appears during epidemic of acute colds. A rash of dusky red spots, not vanishing upon pressure first appears upon the chest, abdomen, and back. It may be slight in mild cases but prominent in severe cases.

TREATMENT.—Patient should be kept in bed in a cool, darkened room. Give Sulfadiazine, 8 tablets (4.0 grams) at once and 2 tablets (1.0 grams) with ½ teaspoonful of soda bicarbonate every 4 hours day and night until temperature has stayed below 99° F. for 48 hours. Give at least 3½ quarts of liquids a day. Watch for poisoning from Sulfadiazine (q.v.). Diet will be tolerated. Patient may become delirious so should be watched.

METHODS OF CONTROL.—*Isolation.*—Isolation of infected persons until 14 days after onset of the disease.

Quarantine.—None, but all close contacts should receive 15 grains of sulfadiazine 3 times a day for 3 days.

General measures.—Disinfection of articles soiled by discharges from the nose and throat. Prevent overcrowding, chilling, fatigue, and undue strain. Thorough cleansing of compartment after recovery or removal of patient.

DELIRIUM TREMENS

Delirium tremens occurs as an incident in the life of persons addicted to the excessive use of intoxicating liquors.

SYMPTOMS.—Loss of appetite, sleeplessness, or a marked mental depression are the chief symptoms of the first stage of the affliction known among drunkards as "the horrors." As the disease advances the patient talks incoherently, has a wild expression, his mind wanders from one thing to another. He answers questions in a rambling manner and fancies he is being pursued by wild animals, or that he sees rats, snakes, and other animals crawling on the walls around his bed. The delirium is always worse at night, but the patient requires watching at all times, for he may try to jump overboard or commit suicide in some other way. Delirium tremens may be confused with the delirium of acute fevers. Pneumonia is a frequent complication of delirium tremens and in fatal cases may be the direct cause of death. It may, in drunkards, follow a fracture or other injury.

TREATMENT.—The patient requires constant attendance. In all cases the symptoms are aggravated by the lack of food, which the patient has

been either unable or unwilling to take. Careful feeding is of the utmost importance. Thick, nourishing soup constitutes the best food in this condition and should be given every 2 hours and the patient encouraged in every way to take food. Arrangements should be made for a medical officer to assume charge of the case as soon as possible. Give hot beef extract. This, and the soups are rendered more effective and palatable by addition of pepper as seasoning. The serious symptoms are largely due to sleeplessness, and if several hours of sound sleep can be produced, improvement is almost sure to follow. To this end, phenobarbital in 1½-grain doses should be given with water every 3 hours for 4 doses. Sometimes by wrapping the patient in a sheet and blankets wrung out in very hot water and at the same time applying cold to the head, a sedative or quieting effect is produced and the patient gets rest, even if no sleep.

UNCONSCIOUSNESS

The common causes for unconsciousness are asphyxiation, bleeding, shock, electric shock, heat exhaustion, freezing, sunstroke, epilepsy or fits, apoplexy and injury to the brain, alcoholism and certain other poisons, hysteria and uremia (deficient secretion of urine). In all cases of unconsciousness strenuous efforts should be made to bring the patient under the care of a medical officer as soon as possible.

If the person is unconscious and the cause is unknown, let him rest flat on his back. If he is pale and the surface of his body is cold, apply heat to the body and hold smelling salts or a little ammonia under his nose. If the surface of the body is very hot, cold water and ice bag should be applied to the head.

Patients who have been rendered unconscious because of injuries should, in general, be treated for shock and kept as quiet as possible until medical aid can be obtained.

FAINTING

This results from diminution of blood in the brain, due to many causes. The person gets paler and paler, there is a sinking feeling, and he falls unconscious. This often can be prevented by placing the patient in a chair with his head forward between his legs, lower than his hips. But after its occurrence, the patient should be laid flat on his back with head low; loosen clothes and give plenty of fresh air; a little ammonia held under the nose will often revive him. After recovery, give whisky or aromatic spirit of ammonia.

EPILEPTIC FITS

The patient usually utters a cry, falls suddenly unconscious, has convulsions, foams at the mouth, and bites his tongue. After convulsions

cease, he passes into a deep sleep and remains in that state for several hours.

During the convulsions, the only thing to do is to try to prevent him from hurting himself. Something suitable (a piece of wood or cork covered with a handkerchief) should be put between his back teeth to keep his mouth open so he cannot bite his tongue, taking care that it does not fall down his throat. When consciousness has completely returned, a cathartic may be given, because in those subject to epilepsy clogging up of the bowels often brings on an attack. If some time must elapse before medical aid can be obtained or the epileptic discharged, give one tablet of phenobarbital (1½ grains) three times a day. The tablet should be crushed or chewed and taken with a half tumbler of water. A man known to have fits should not be retained aboard ship. He is unfit for the service and may injure himself seriously by falling down a hatchway or into the machinery, etc.

Diseases of the Eye

INFLAMMATION

In all inflammations of the eye, ascertain at once if the individual has gonorrhea. If he has, the chances are that you are dealing with a very severe condition which should be brought to the attention of a medical officer immediately. Treatment of this condition (gonorrheal ophthalmia) is discussed in the next chapter. Simple inflammation is caused by irritation, such as exposure to the wind or dust, by foreign bodies in the eye, and frequently by the fumes of turpentine contained in paint used in confined places as when painting double bottoms, etc.

Symptoms.—The eye is bloodshot and watery, the patient complains of pain; the sensation of sand in the eye, and heat. A thin watery discharge appears which tends to stick the lids together.

Treatment.—Turn back the upper lid, pull down lower lid, remove all small particles of dust and dirt by gently wiping the lid with cotton loosely wound about a match stem. To turn back the upper lid, have the patient look downward then lay a match stem lengthwise along the middle of the lid, press down gently and at the same time pull up on the lashes. Have the patient look in all directions, for by this means particles of irritating matter which do not at first appear may be brought to view. After having removed all the irritating particles, wash the eye with warm borax solution using a small piece of cotton saturated with this solution held very closely to the inner angle of the eye. Do not drop solution on the eyeball.

Eye wash (or borax lotion).—A simple, soothing and antisepetic eye wash may be made as follows: To 2 quarts of boiled, distilled water in

a large bottle, add 1 level teaspoonful each of borax, sodium chloride (table salt), and sodium bicarbonate (baking soda). Dissolve by shaking, and let stand until clear. Pour off the clear fluid and bottle. Use in the eye bath freely, either cold or warm. This solution is alkaline, non-irritating, and is much superior to boric acid solution.

STYE

A stye is a pustule which forms on the margin of the eyelid around an eyelash. The lid is inflamed, painful, and has the general appearance of a small boil.

TREATMENT.—Pain may be relieved by applying squares of gauze wrung out of hot salt solution. When the stye ruptures, keep the lid clean with frequent washings with salt solution or borax solution in order to prevent recurrence of styes. Yellow oxide of mercury ointment painted on the margins of both lids of both eyes upon retiring will assist in the cure and act as a preventative. Recurring styes may be a symptom of defective vision. In such cases, the patient's eyes should be refracted by a medical officer when the schedule of the ship will permit.

DISEASES OF THE EAR

EARACHE

TREATMENT.—Earache is due to so many different causes that a medical officer should be consulted as soon as possible. To relieve pain, if severe, aspirin, 2 tablets, (gr. 10) may be given every 4 hours.

DISEASES OF THE TEETH

TOOTHACHE

This condition is usually due to an inflamed pulp which has become infected or irritated through a cavity in the tooth, the congestion compressing the pulp against unyielding sides of pulp cavity causing pain. To give relief, remove particles of food from cavity and insert a small piece of cotton moistened with dentalone or eugenol after first being touched to another piece of cotton to remove excess fluid. Excess fluid may burn the gums. This treatment should be renewed every day or two until dental attention is available. Should swelling of soft tissue occur, apply heat and administer sedatives.

Chapter IV

VENEREAL DISEASE

The venereal diseases you will deal with are gonorrhea, syphilis, chancroid, lymphogranuloma venereum, and granuloma inguinale. The first three are the major and most important, being much more common than the last two named.

When no medical officer is available, venereal disease cases should be transferred to adequate medical facilities as soon as possible. During war time, however, when long periods at sea are necessary, transfers are often not possible and thus it is essential that you know the basic facts about these very common diseases. It has often been said the venereal disease rate of any command reflects the efficiency of that command.

As all venereal diseases can be prevented, prophylaxis, or how to prevent, is listed first.

PROPHYLAXIS

Continence.—Avoiding exposure is the only sure way of avoiding any disease. This method of avoiding venereal disease is called continence. No exposure—no disease—and no worries. Remember too that close intimate contact with an infected girl as kissing, preliminary sex play, etc., even without actual exposure may result in venereal disease, especially syphilis.

Chemical and Mechanical Prophylaxis.—If exposure does occur, venereal disease can usually be prevented by these methods:

Mechanical.—The most common and best form is the condom (sheath, rubber). It should be applied early before any "playing around" occurs, leaving adequate space at end, and removed very carefully when no longer needed. Only the best condoms should be purchased. Those sold at cheap prices in cheap places and often those in foreign ports are inferior makes and/or "rejects." Immediately after removal of the condom, all parts should be washed including the hands, and then the chemical prophylaxis applied to protect those areas not covered by the condom. Remember too, condoms sometimes leak or break, so the chemical prophylaxis should be applied to ALL parts immediately.

Chemical.—If used properly within the first hour this chemical prophylaxis affords a high degree of prevention. Its efficiency decreases rapidly with time, however. Use it as soon as possible after exposure. Some protection is gained even 8 to 10 hours after exposure.

Types of Chemical Prophylaxes

The best is the Navy Tube prophylaxis as it can be applied immediately. One half of the contents of the tube should be injected into the urethra (canal in penis) and the other half spread over the pubic region, the thighs, penis, and scrotum. Massage in thoroughly for 10 minutes and avoid urinating for at least 6 hours.

Ship Prophylaxis.—A good and almost sure preventive can be obtained by the following method if administered within 2 hours of exposure.

a. Urinate.

b. Wash the penis, scrotum and pubic area with warm water and soap and dry.

c. Inject gently ½ syringe of 1 percent solution protargol (strong protein silver) or 10 percent argyrol (silvol or mild protein silver) into the canal. Hold end of penis for 4 minutes then allow the solution to drain out.

d. Apply either the contents of the Navy prophylactic tube or a 33 percent calomel ointment to all parts as outlined above. Special attention should be given to the various skin folds and crevices. Clothing can be protected by paper or gauze dressings.

GONORRHEA

Gonorrhea is the most common of all venereal diseases.

Cause.—A microscopic organism always occurring in pairs. The disease is contracted almost always through sexual intercourse.

Symptoms and Signs.—A creamy yellow discharge from the penis which may be accompanied by burning and difficult urination. This most often occurs 3 to 5 days after exposure but can come on any time in the first two weeks.

Treatment.—Sulfathiazole will cure a high percentage of the cases in five days. The tablets are one half gram (7.5 grains). Two tablets should be given at 0800, 1200, 1600, and 2000 each day for 5 days—a total dosage of 20 grams (40 tablets). Extra water should be taken while on this drug. Some men may be sensitive to this drug and will show it with nausea, vomiting, dizziness, headaches, or red rash on skin. The drug should be stopped if this occurs.

The older form of treatment of injections of ½ syringe of 5 percent to 10 percent argyrol (mild silver protein), freshly prepared, into the canal and held 5 to 10 minutes may be used for patients sensitive to sulfathiazole. This should be injected daily morning and night. This solution can be diluted with water if too much burning results.

Dressings should be used to protect the clothing and to catch the

draining pus. Under no circumstances should the canal be obstructed.

Regular diet, plenty of water and normal duty are indicated. Excessive watches and heavy duty should be avoided.

COMPLICATIONS.—These are rare with the modern methods of treatment but may occur.

Epididymitis (swollen testicle).—Bed rest—support testicle—apply heat with hot water bottle. Sulfathiazole medication should be completed if already started—at least one course is necessary.

Phimosis and paraphimosis.—The foreskin is swollen either down over the head of the penis and can't be drawn back or back of the head of the penis and can't be drawn forward.

Soak penis every 2 to 3 hours in hot salt water or hot epsom salts solution. Cold soaks sometimes help where heat has failed.

Put patient to bed.

Bubo (Blueballs).—Swollen glands in groin. Bed rest. Apply cold (ice bag) early. If swelling persists and gets worse substitute heat for cold. Do not worry over size of glands. They may rupture of their own accord and drain. In that case, apply dressings and continue heat. Keep all parts clean with frequent soap and water baths.

Stricture Urethra.—This usually is a late compliction of gonorrhea and is quite rare. The patient is unable to urinate. Put to bed, reassure patient, apply heat over bladder (lower abdomen), place in hot bath if necessary. As a last resort attempt to pass rubber catheter after it has been boiled and greased (be gentle).

Gonococcus infection eye.—Usually occurs in patients with gonorrhea of the urethra. Marked by angry red inflamed eye with creamy discharge of pus.

Immediately protect other eye with dressings or a shield (watch crystal, celluloid, plastic) secured in place with adhesive tape.

Wash infected eye every 3 hours with boric acid solution.

Cold compresses usually are more comfortable. The sulfathiazole medication should be completed. Transfer to a medical officer as soon as possible.

NOTE.—Every case of gonorrhea should be warned of this danger and should be careful not to contaminate towels, clothing and hands with the discharge from his penis. Washing of hands is a necessity.

SYPHILIS

Syphilis is the most serious of the more common venereal diseases. Usually contracted through sexual intercourse with an infected person—occasionally through kissing—always through close intimate contact.

Cause.—A microscopic, corkscrew-like organism.

Symptoms and signs.—The first lesion is a sore—a small painless, hard ulcer somewhat like the common cold sore, usually occurring on the penis. It develops 3 to 6 weeks after exposure. If not treated it will heal in 3 to 6 weeks and almost always is followed by the secondary stage of skin rash (coppery colored), sore throat, headaches, and general aches and pains. This occurs usually 6 to 15 weeks after the original sore.

Treatment.—Don't treat the sore with antiseptics. Simply keep it dressed and moist with salt solution (½ teaspoonful salt to ½ pint of water). Any other care will make diagnosis difficult or impossible. Transfer as soon as possible to adequate medical facilities.

If desired and it is thought that the sore on the penis is chancroid (see below) sulfathiazole may be given as for gonorrhea and chancroid. This medication by mouth does not affect syphilis nor delay its diagnosis and yet gives good results in both gonorrhea and chancroid.

CHANCROID

A disease of southern United States and the tropical countries.

Cause.—A microscopic long, rod-like organism.

Signs and Symptoms.—A dirty, soft irregular and often painful ulcer of the penis or scrotum. Often there is more than one ulcer. May be confused with syphilis (above). Often complicated by bubo (blueballs). Occasionally a patient may have syphilis and chancroid at the same time.

Treatment.—Cleanliness—wash frequently with soap and water and dry with disposable gauze. Sulfathiazole by mouth exactly as directed under gonorrhea and with the same precautions.

Complications as under gonorrhea may occur and should be treated similarly.

LYMPHOGRANULOMA VENEREUM

Lymphogranuloma venereum is a disease of the lymph channels and lymphnodes and is more common in the tropical climates.

Cause.—A filtrable virus.

Signs and Symptoms.—A small hardly noticeable lesion of the penis or near parts occurring 5 to 21 days after intercourse, followed most often by bubo in inguinal area. Fever, loss of both appetite and weight may be present.

Treatment.—Same as for chancroid. Transfer to medical care as soon as possible.

GRANULOMA INGUINALE

This fifth venereal disease is not too common and occurs most often in the tropics. It is characterized by slowly progressing irregular type

of lesions. It is very chronic and should be remembered simply that it exists, requires prolonged treatment and any such case should be transferred to adequate medical care as soon as possible. No treatment is indicated outside of ordinary cleanliness while the patient is aboard your ship.

Chapter V

HOSPITALIZATION

Sick, wounded, or disabled officers and enlisted men of the Navy, or Marine Corps are entitled to the benefits of medical and dental attendance by naval medical and dental officers either within or without a naval hospital, and to hospitalization within naval hospitals so long as they remain sick, wounded, or disabled (N. R. 1187, 1191).

In the absence of naval hospital facilities, the hospitals of the United States Army, the Public Health Service (including hospitals under contract), or the Veterans' Administration shall be utilized for hospitalization of naval personnel.

Patients may be hospitalized in civil hospitals subject to the following conditions:

1. Facilities of naval or other Government hospitals are not available.
2. Patient must be in a duty status or under control and supervision of competent naval authority.
3. Immediate hospitalization is required for the proper care and treatment of the patient.
4. Hospitalization must be authorized by the commanding officer, or by the senior officer present when practicable; and, when not an emergency, by the Bureau of Medicine and Surgery.

Attention is also invited to instructions in articles 1143 and 1203, N. R., concerning patients transferred to other than a naval hospital, particularly in a foreign port.

The public health officer of the port, if present, should be consulted regarding hospital facilities, and admission of the patient should be made with his approval and under his directions. A list of the Public Health Service hospitals as well as its contract stations will be found in the annual circular, Contracts for the Care of Seamen, etc., issued by the Public Health Service.

Claims for dental expenses will be allowed only when such expenses have been incurred in emergencies by personnel of the Navy and Marine Corps to whom the services of a naval dental officer were not available, and when the approval of a naval medical officer, if available, has been secured.

The term "in emergencies" is intended to be applied to treatment rendered to alleviate suffering or to prevent suffering which will obviously occur before the approval of the Bureau of Medicine and Surgery can be obtained. Emergency treatment will not include the furnishing of prosthetic appliances or the use of precious metals.

Attention is invited to article 1189, Navy Regulations, in which are stated the conditions under which medical expenses may be allowed, and especially to the requirement that payment of such expenses is contingent upon the prompt reporting of illness or injury to the Bureau of Medicine and Surgery.

Upon completion of treatment, unless authorized in advance by an approved requisition, itemized certified bills shall be submitted to the Bureau of Medicine and Surgery in duplicate, and shall show the cost of each item of expense and the dates on or between which the services were rendered; for dental treatment they shall also show in detail which teeth were treated, the nature of the treatment rendered and the materials used. Bills of other Government hospitals will be submitted through their respective headquarters.

Receipt of the services by the party receiving treatment or by the officer authorizing same shall be acknowledged either on the face of the bills or by separate certificate.

When requisitions for civilian medical, dental, nursing, or hospital treatment of service personnel are approved by the senior officer present in advance of the Bureau's approval, Form U report shall be accompanied by a copy of the requisition and a copy of each public voucher covering payment.

Ordinarily, naval personnel on leave are not in a duty status and are not, therefore, entitled to medical or hospital treatment at Government expense. When leave is cancelled or extended, the status remains the same and commanding officers are without authority to authorize treatment for them at Government expense. Personnel who have been granted liberty for a period of 24 hours or less are considered as in a duty status provided that during the period of liberty it would be fairly practicable to secure their return for the performance of duty should their presence be required.

Commanding officers are responsible for bringing this information to the attention of all officers and enlisted men about to go on leave of absence and to the personnel under their charge when on detached duty. Personnel on leave of absence may be hospitalized in other Government hospitals in the absence of naval hospital facilities.

A report on NAVMED U shall be immediately forwarded in duplicate to the Bureau in each case of any sickness or injury of personnel of the Navy or Marine Corps where treatment is received from other than the Medical Department of the Navy. This report is required in all cases where medical, dental, or hospital treatment is furnished by civilian physicians, civilian dentists, civil hospitals, or Government hospitals other than naval to personnel of the Navy and Marine Corps, whether on duty or on liberty or leave, under circumstances that eventually may be used

as the basis of a claim against the Navy Department. This report should be prepared by a naval medical officer when practicable, and in the absence of such officer, by the senior officer present, or by the individul concerned as soon as able.

If printed forms are not available, a typewritten report may be made in duplicate giving the following information: Name and rank or rating; date and place of birth; station or vessel to which attached; diagnosis; prognosis; status (duty or not). If on liberty or leave, state exact period for which granted and the hours and dates from and to; circumstances; disposition; give dates on or between which services were rendered; by whom were the services rendered. Were the services necessary and authorized, and by whose authority? Where authority is given in writing, a certified copy of same should be attached to this form. Where authority is given verbally, a certificate of the officer granting same should be attached and should show when and how the services were authorized. Were the services of a naval medical (or dental) officer or a naval hospital available? In the case of an officer, the date of his orders and the name of the Supply Corps officer carrying his accounts shall be stated. When an officer is admitted to a hospital for treatment, statement shall also be made as to whether or not hospital ration notice has been issued.

Due to the uncertainty of the movements of naval vessels, the personal effects of an officer or man of the service are sent with him whenever he is transferred to a hospital for treatment (N. R. 1143).

Chapter VI

DEATHS

The commanding officer shall cause to be entered in the log book the name and rank or rating of any person who may die on board, with a statement as to the exact time and cause of death (N. R. 908 (1)).

When death occurs while the ship is at a port within the continental United States, the commanding officer shall report the same to the Secretary of the Navy by dispatch, giving the following information: (a) full name; (b) rank or rating and service number; (c) branch of service; (d) in the case of a reservist, whether or not on active duty; (e) date, place, and cause of death; (f) line of duty and misconduct status; (g) full name and relationship of next of kin; (h) address of next of kin; (i) whether or not next of kin has been notified; (j) what disposition has been or will be made of remains, or where the remains are being held; (k) pay per month; (l) full name and address of beneficiary; (m) whether or not the deceased carried United States Government life insurance and date to which premiums have been paid. In case full information under any of the foregoing headings must await later investigation or determination, the dispatch shall be sent with whatever data are available, and supplemented with complete information at the earliest possible date. In such cases he shall also inform (by dispatch) the nearest relative or legal representative of the deceased (unless living outside of continental United States) and request him to communicate by telegram with the Bureau of Medicine and Surgery, Navy Department, or the Commandant, Marine Corps, Washington, D. C., regarding disposition of the remains. If practicable, the body shall be transferred immediately to the nearest naval hospital or to the medical department of the nearest navy yard or station for embalming, preparation, and retention for such further disposition as may be directed by the Bureau of Medicine and Surgery. Otherwise the body shall be embalmed and retained on board until directions for disposition are received (N. R. 908 (2)).

When death occurs at sea or in a port outside the continental United States, the commanding officer shall not notify the next of kin by dispatch but shall make report by dispatch to the Secretary of the Navy, giving the information specified in the preceding paragraph, and request instructions for disposing of the body. Whenever practicable, the remains shall be embalmed and retained on board awaiting instructions from the Bureau of Medicine and Surgery, and burial shall not be made in a foreign port or at sea in advance of receipt of such instructions, except when preservation or retention of the body is impossible (N. R. 908 (3)).

NOTE: Pursuant to a directive of the Secretary of the Navy, on June 25, 1942, the Bureau of Medicine and Surgery issued the following instructions:

For the duration of the war, the remains of naval personnel, inclusive of the Marine Corps and the Coast Guard, shall be interred locally whenever death occurs in areas beyond the continental limits of the United States and where transportation by sea is involved.

In making overseas burials, naval forces shall take all necessary measures to preserve identity, to definitely locate and record burial places by proper geographical data, names, landmarks, charts, etc., and will transmit this data to the Bureau of Medicine and Surgery with copy for the Bureau of Naval Personnel, Marine Corps Headquarters, or Coast Guard Headquarters, as may be appropriate.

During this time when remains of the dead may not be returned home, in any case where burial ashore can not be accomplished or is inadvisable, burial at sea is to be preferred to cremation. Cremation should not be done, except as a sanitary measure, without the prior approval of the Bureau.

Whenever loss of life occurs from accident or under peculiar or doubtful circumstances, a court of inquiry or a board of investigation should be ordered to investigate fully and report on the circumstances and facts, and also to give an opinion and to make such recommendation as may be appropriate. The court of inquiry or board of investigation is held in accordance with the provisions of chapter X, Naval Courts and Boards.

In all cases of death occurring in the Navy under unnatural or suspicious circumstances, or where the cause of death is obscure or not apparent and a decision as to origin affecting pension or gratuity is involved, the commanding officer should have such post mortem examination or autopsy as may be required in determining the exact cause of death performed by a medical officer, or, if none is available, by a competent civilian physician. In all cases the autopsy must be performed in a manner requiring no more disfigurement of the body than is necessary to obtain the evidence necessary. The results of all autopsies shall be fully recorded in the reports of death and health records.

When burial is necessarily made in a foreign country, the health regulations as to disinterment shall be ascertained and reported by letter to the Bureau of Medicine and Surgery, together with information as to date, place, and other circumstances of burial.

Payment of expenses in connection with burial in a foreign country may be arranged through the nearest United States consul in the same manner as payment of bills for hospital treatment, reimbursement to be made by the Navy Department to the State Department upon presentation of receipted vouchers. Such expenses, so far as practicable, should be limited to the lowest amount consistent with decent preparation and encasement in accordance with Navy Regulations, or to meet the requirements of laws governing transportation.

Whenever the services of a civilian undertaker are required within the United States or any of its possessions, the same limitations will be observed and itemized bills properly certified will be forwarded to the Bureau of Medicine and Surgery for settlement.

Cremation of remains will be permitted at Government expense only when authorized in advance by the Bureau of Medicine and Surgery.

The necessary and proper funeral expenses of officers and enlisted personnel of the Navy and Marine Corps at naval stations within the United States will be provided for by annual contracts, and elsewhere within the United States will be allowed when approved by the Bureau of Medicine and Surgery, or by such officers as may be designated by the Commandant, Marine Corps, respectively.

The amounts paid for funeral expenses, including preparation, encasement, and interment of remains, shall not exceed $200 each, unless due regard for decent burial renders greater expense necessary, which fact must be certified on all copies of the public voucher by the officer ordering the payment of the bill.

The remains of naval dead shall be prepared for interment or for shipment to their homes under the supervision of an officer who shall determine by final inspection in each instance that the work of embalming, cleansing, shaving, and dressing have been competently performed, and that the encasement, clothing, etc., meet all the requirements of the occasion and comply with the terms of the contract.

Each body shall be dressed in a clean, presentable, and complete uniform (except for cap and shoes) of the proper rank or rating. A cap may be placed inside of the casket. When a body is sent to a hospital or hospital ship for embalming and further disposition, suitable uniform for burial shall be sent with it. Where available clothing belonging to a deceased officer or enlisted man is not sufficient in quantity or of proper kind or quality, or is too much worn, new clothing (outer and under) shall be obtained as may be necessary from the Supply Department and charged to the appropriation "Medical Department."

Especial care shall be exercised that the evidences of autopsies shall not cause unnecessary distress to parents, and that the wounds so made shall be neatly closed, and that packings and dressings employed shall be of clean and suitable material.

Navy (or Army) standard caskets, when available, shall be used for transportation of remains of officers and enlisted men.

When transportation of remains of naval or Marine Corps personnel is to be effected, the shipment if by rail will be either on tickets procured by transportation request or by express on Government bill of lading; and, if by commercial steamship, on minimum first-class fare. One copy (fifth) of the bill of lading, on which transportation of remains

of the dead is effected, shall be securely pasted on top of the shipping casket with a dextrin paste, similar to that used by the express company, and then covered with shellac or varnish. A special label, prohibiting collection of express charges from consignee, should be obtained from the local express agent and attached to the outside case, in addition to the copy of the bill of lading. If Government bills of lading are not available, the civilian undertaker should include transportation charges in his bill, submitting receipts from the transportation company. Under no circumstances should a body be sent "collect."

Personal effects of active-duty personnel not to exceed 150 pounds may be forwarded with the body when shipped either by express or on transportation request without additional charges. When personal effects exceed 150 pounds, any excess should be delivered to the supply officer for shipment, such excess being chargeable to the appropriation "Transportation of Things," Bu. S. & A. for Navy personnel and "General expenses, Marine Corps," for Marine Corps personnel.

The next of kin, family, legal representative of the deceased, or, the consignee, should the body be sent to other than the preceding, shall be informed by telegram of the time and method of forwarding and, if practicable, the routing and scheduled time of arrival at destination; also of any special attending circumstances, such as communicable disease and the advisability or inadvisability of opening the casket for the purpose of viewing the remains. Original and one copy of the bill of lading will be promptly forwarded to the consignee, under special-delivery stamp, and accompanied by an explanatory memorandum. Investigation has determined that in most instances where the express company attempts to collect express charges from consignee, the difficulty has been due to failure of the bill of lading to arrive in advance of the body, or to a misunderstanding on the part of consignee as to its purpose.

The senior officer present is authorized to issue a national flag (United States national ensign No. 7) to accompany all bodies of naval or Marine Corps personnel forwarded or delivered to the next of kin or relatives for private interment, in order that the flag may be available for use at the time of burial. Request for such issue shall be construed as included in application for the body. The flag shall be inclosed in a suitable canvas bag or sack and securely attached to the casket, or placed inside the shipping box, in which case the box shall be labeled "FLAG INSIDE" or the consignee otherwise notified. The act of May 26, 1928, authorizing the Secretary of the Navy to furnish an escort to place of burial for the naval dead who have lost their lives in the naval service, permits the selection of a relative or other person not a member of the Navy or Marine Corps to be sent as such escort at Government expense. The expenses so authorized include subsistence en route and sleeping-car ac-

commodations to place of burial and return therefrom when necessary. Upon request of the next of kin or family of the deceased, a service or civilian escort of one person may be assigned to accompany the remains to place of burial. The escort, if of the service, shall be of the equivalent rank or rate of the deceased so nearly as may be practicable, and, when possible, a friend or associate. United States Navy Travel Instructions contain full instructions relative to travel allowances and outline the details to be followed in sending an escort to accompany to place of burial the remains of officers and enlisted men who have lost their lives in the naval service. The travel of the escort may be from point of shipment to place of burial and return, or from the place of prospective burial to the point of shipment and return, the amount of travel involved in either case being the same. When the remains are returned to the Unitd States from points outside the continental limits, a relative may travel as escort to point of reshipment within the United States. One first-class passage at minimum rate will be furnished such civilian escort. From this point the commandant of the yard or station shall arrange for escort to final destination of remains as in other cases.

All transportation and travel expenses of the escort to the prospective place of burial and return therefrom will be a charge to " 'Pay,' 'Subsistence,' and 'Transportation' or 'General Expenses,' Marine Corps," as the case may be. The only charge to be lodged against the appropriation "Medical Department," when remains of naval dead are shipped on transportation requests, is for the cost of the corpse ticket. In the case of Marine Corps dead, the cost of both escort and corpse ticket is a charge to "General expenses, Marine Corps."

The commanding officer shall, upon the death of any person on board the ship under his command, cause all of the effects of the deceased to be collected and inventoried. If the deceased was an officer, this shall be done by two officers of the ship; if a member of the crew or other person, by the officer of his division or one detailed for the purpose. The inventories shall be made out in duplicate, duly attested and signed by the officers making them. Upon the completion of the inventory the effects, if not of a perishable nature, shall be put up in packages of a convenient size and sealed with the seal of the ship. The commanding officer shall retain one copy of the inventory himself, and shall deliver the other to the supply officer, who shall also take charge of the effects for safekeeping (N. R. 908 (4)).

If any of the effects of a deceased person are perishable and deteriorating, they shall be immediately sold at auction, and the proceeds of sale shall be dipsosed of in the same manner as other money found in his effects (N. R. 908 (5)).

All moneys, articles of value, papers, keepsakes, and other similar ef-

fects shall be forwarded to the legal representative, or in default of such, the heirs at law of the deceased. Should it be impossible to ascertain the existence of the legal representative or of heirs at law, the articles mentioned and other similar effects shall be sent to the Chief of the Bureau of Naval Personnel or to the Commandant of the Marine Corps, as the case may be, for safekeeping. Should the above-described property be unclaimed for a period of 2 years after the death of the owner thereof, all articles and effects so deposited shall be sold at auction to the highest bidder, and the proceeds of such sale shall be deposited in the Treasury as miscellaneous receipts (N. R. 908 (6)).

If at any time during the 2 years such above-described property is in the custody of naval authorities the legal representative of the deceased person shall apply for his effects, all shall be delivered to him (N. R. 908 (7)).

The commanding officer shall exercise his discretion in causing the effects of deceased enlisted personnel to be sold at auction at the mast, or retaining them for transmission to the heirs, relatives, or friends. In exercising this discretion, he shall be governed by the wishes of the heirs, relatives, or friends, if possible to learn them. If sold at auction, the proceeds of sale shall be disposed of in the same manner as moneys found in their effects (N. R. 908 (8)).

He shall cause the accounts of all deceased persons to be closed as soon as possible and forwarded to the General Accounting Office, together with the will, if any can be found. These accounts must be examined and approved by the commanding officer (N. R. 908 (9).

He shall advise the heirs or next of kin of a deceased officer, nurse, or enlisted man to communicate with the Bureau of Supplies and Accounts relative to the submission of claim for arrears and pay due. Payment of death gratuity will be made by the Bureau of Supplies and Accounts (N. R. 908 (10)). For additional information pertaining to deaths and resultant duties, the reader is referred to articles 908 and 1841, United States Navy Regulations, and chapter 19, Manual of the Medical Department, 1939.

NOTE: Distribution Centers in the United States have been established by the Secretary of the Navy by letter of 17 June, 1943, to All Ships and Stations, as follows:

In order to relieve commanding officers outside the continental limits of the United States of the necessity of sorting and shipping personal effects of deceased or missing personnel, the following distribution centers are hereby established, each under an officer in charge:

Personal Effects Distribution Center.
U. S. Naval Supply Depot
Clearfield, Utah

as an activity of the Twelfth Naval District.

Personal Effects Distribution Center
U. S. Naval Supply Depot
Scotia, New York

as an activity of the Third Naval District.

In order to reduce delay and the possibility of loss by subsequent enemy action commanding officers may immediately inventory and ship personal effects to these centers without waiting for notification of next of kin.

Chapter VII

PERSONAL HYGIENE

By personal hygiene is meant any measure taken by the individual by which he can avoid disease and promote his health and strength. Such measures include the eating of the proper amount and kind of food, drinking the proper kind and amount of water, the wearing of proper clothing to suit the temperature, the breathing of wholesome air, all of which tend to heighten resistance; the avoidance of habits and practices which are liable to contract or transmit infectious diseases such as those borne by the mouth, nose, intestinal, venereal discharges, etc.; the proper use of the eyes, etc. Cleanliness of the person and the clothing is one of the first requisites for good health. The entire body, if practicable, but at last the feet, armpits, and genitals should be bathed daily, and the exposed parts of the body, face, and neck as often as necessary. The hair should be kept cut short, and the finger and toe nails kept trimmed and clean. Dirty bodies and dirty, infected clothing are very often the cause of skin and other diseases. A moderate amount of exercise in the open air should be taken regularly. With proper exercise the elimination of waste products from the body is increased through deeper breathing, and more perspiration; the muscles and heart become better nourished and a better circulation improves all the other functions of the body; the digestion is improved; and resistance to certain diseases is increased. The bowel should move daily, otherwise poisonous substances are absorbed into the system. If proper food is eaten and proper exercise taken, the bowel generally will look after itself. The mental state may affect the health and a cheerful state of mind promotes and benefits all the functions of the body and vice versa.

Not only is the practice of personal hygiene one of the greatest factors in the prevention of disease, but also it is one of the chief aids to the sanitarian in destroying or preventing the transmission of the agents which cause the communicable diseases. Infective discharges from the respiratory tract can be readily transferred to others by promiscuous coughing, sneezing, and expectorating, or by the use in common of towels, drinking cups, and eating utensils. Good personal hygiene will prevent many of the air-borne and hand-to-mouth infections.

Following is a summary of the principles of personal hygiene which are adaptable to naval life:

1. Keep the body clean. Bathe the entire body, or as much of it as possible daily.

2. Keep the hands clean. Always wash them before eating and after leaving the toilet. Keep the fingers away from the nose and mouth, and the fingernails clean and cut short.

3. Keep the feet clean and the toenails cut short and straight across.

4. Change the underwear and socks frequently. Wear socks that are 1½ or 2 sizes larger than the shoe size and shoes that have been fitted carefully.

5. Brush the teeth every morning and evening or after each meal if possible. Have the teeth examined by a dentist at least every 6 months.

6. Eat slowly a moderate amount of nutritious food regularly and drink plenty of pure water.

7. Be regular in going to the toilet for bowel actions.

8. Take a moderate amount of exercise in the open air regularly. Breathe deeply at all times.

9. Sleep in a well-ventilated place with plenty of fresh air.

10. Avoid excesses of any kind, but especialy alcoholic drinks and promiscuous sexual intercourse. If exposed to venereal infection immediately use prophylaxis.

11. Avoid persons with colds or coughs and keep away from others when suffering with one. Cough and sneeze in a handkerchief.

12. Avoid unnecessary exposure to extremes of weather. Change into dry clothes as soon as possible after getting wet, and dry the wet clothing before stowing it away. Clothing wet with perspiration should be dried and, if possible, washed before being stowed away.

13. Avoid using the toilet or other personal articles of others and do not allow others to use one's own.

14. Be cheerful.

The precautions regarding the care of the hands and fingers are of particular importance for the majority of infections are taken into the body through the mouth, and the hands are responsible for a large number. Likewise the principle pertaining to "colds" should be closely observed. Finally, if there is one basic law, it is to avoid excesses of any kind (Handbook, Hospital Corps, 1939).

Chapter VIII

PREVENTIVE MEDICINE

In general, preventive medicine has for its objective the control or prevention of disease and the **conservation and maintenance of health.** In the Navy it is similar in its scope to public health activities of civilian communities, except insofar as it is modified, of necessity, by conditions peculiar to the Navy. These modifying conditions are mainly those resulting from factors of environment accompanying naval activities under restrictions imposed by the nature of the service.

The following references in the Navy Regulations pertain to the duties of the commanding officer of a naval vessel in relation to preventive medicine:

1. Provisions (art. 20 (7), N. R.).
2. Health of crew (art. 20 (8), N. R.).
3. Care of crew (art. 843, N. R.).
4. Service on unhealthy stations (art. 901, N. R., see art. 741, N. R.).
5. Effects destroyed to prevent spread of disease (art. 916, N. R.).
6. Cleanliness (art. 1319 (1), N. R.).
7. Precautions as to health of the crew (art. 1319 (2), N. R.).
8. Clothing (art. 1319 (3), N. R.).
9. Bedding (art. 1319 (4), N. R.).
10. Allowance of water (art. 1319 (5), N. R.).
11. Inspection and use of fresh food, etc. (art. 1320 (2), N. R.).
12. Food and water (art. 1320 (5), N. R.).
13. Athletic exercises (art. 1323 (1), N. R.).
14. Bumboats and traffic (art. 1323 (3), N. R.).
15. Harbor water (art. 1324, N. R.).
16. Disposal of refuse (art. 1337, N. R.).
17. Leave to enlisted men (art. 1731 (1), N. R.).
18. Unserviceable and unsanitary articles (art. 1919 (1), N. R.).
19. Clothing and personal effects of officers and men (art. 1925, N. R.).

HEALTH RECORDS

These records, if aboard, should be checked at intervals, once each quarter, to see that there is one for each member of the crew, that they have received the required protective inoculations against smallpox and typhoid fever, and that any belonging to men who have been transferred are forwarded to the proper activity.

FOOD

Regular inspections should be made of the issue room, galley, etc., to observe and correct any unsatisfactory condition regarding the storage, handling, preparation, and serving of food, special attention being given to foods liable to become culture media for bacteria—meats and meat products, fish and shellfish, milk and milk products, salad ingredients, and cream fillers.

FOOD HANDLERS

Cooks, butchers, bakers, helpers, and messmen must be required to keep their hands, as well as utensils and implements used in the preparation and serving of foods, scrupulously clean. Sufficiently close supervision should be maintained over the health of food handlers to insure prompt detection of infectious disease, including venereal infection.

UTENSILS AND MESS GEAR

Cooking utensils should be washed thoroughly with hot water and soap or other cleansing agent after use and after application of mechanical or chemical polishing agents. Mess gear should, after each meal, be washed sufficiently to remove adherent particles of food and mouth secretions, sterilized, and allowed to dry without wiping. The minimum safe sterilization requirement is submersion in, or equivalent exposure to, water at a temperature above 180° F. for not less than 1 minute.

WATER

The evaporation of water, either at atmospheric or reduced pressures and temperatures, is a physical separation of water from its dissolved and suspended constituents, including bacteria. Low pressure and temperature evaporation can produce even from contaminated water as reliable and sterile an effluent as high temperature distillation if raw water does not prime or leak into it. The salinity of the distilled water may be watched as an index of operation and the standard of 0.25 grain per gallon should be maintained if possible. If the salinity exceeds 0.5 grain per gallon the water should be discarded and not pumped into the ship's tanks. When reliable information regarding the sanitary quality of water taken aboard at a dock or from a water boat is not available the water should be passed through the ship's distiller. Water from Gatun Lake or other fresh-water lake in the Canal Zone should always be so treated.

The average minimum actual consumption of fresh water per person on board ship required in the interests of personal hygiene is about 20

gallons per day. Arbitrary limitation of hours during which washrooms are open for use, or restriction of members of the crew to definite small quantities of water for bathing and washing clothes tend to result in serious breaches of hygiene. If unusual circumstances require drastic restrictions in the use of fresh water the allowance should be not less than two full buckets per man per day for the general crew and not less than four buckets for men of the engine room, fireroom, and shop forces.

Scuttle-butt terminals should be kept in good condition and at a slight angle so that water does not fall back on the outlet. Valve handles, like door knobs, may be an important indirect means of transmitting the causative agents of communicable disease. This can be obviated by the use of a foot-controlled valve. Under epidemic conditions they should be frequently disinfected and disinfectant solution provided for hands. In places where sanitary scuttle-butts are not available suitable arrangements must be made to prevent the use in common of drinking cups or glasses.

VENTILATION

Living compartments, offices, and work spaces are to be kept in the comfort zone, insofar as weather conditions permit. Ventilation ordinarily is effected by supply and exhaust blowers, electric fans, and by natural means.

In cool and cold weather adequate ventilation requires a sufficient quantity of air flowing through a given space to keep the air reasonably free from harmful substances and disagreeable odors. In hot weather the volume of air required for the removal of excess heat is so great that other ventilation factors usually become inconsequential. Exhaust-system blowers are required for rapid removal of overheated or malodorous air from compartments in which good ventilation cannot otherwise be maintained. Both supply and exhaust systems are considerably reduced in efficiency by accumulation of dirt in ducts and upon screens.

Compartments which have been closed for some time, or those which have been sealed, should not be entered until after they have been well ventilated and the air tested by a lighted candle. If the flame is extinguished the air is unsafe. Men should not descend into such compartments without having a life line attached to them and carefully guarded.

GARBAGE

Garbage is unsightly and usually malodorous. By attracting flies or rats it may indirectly menace health. When prompt disposal is not possible cans with well-fitting covers should be used. With an unusual number of cans in use it is difficult to keep them in satisfactory sanitary condition. To avoid nuisance base-force arrangements should be made in advance for daily disposal.

Accumulations of refuse below decks increase fire hazards and have a certain bearing on health by inviting expectoration (article 1337 N. R.). Dock garbage and refuse platforms must be properly used and kept clean by ship's forces. Good sanitary condition at all hours is necessary to limit numbers of flies, roaches, and rodents.

SEWAGE DISPOSAL

Disposal of ship sewage overboard by salt water carriage offers no sanitary problem except the pollution load added to harbor water about the ship. When conditions are otherwise favorable and swimming is permitted, discharge of sewage from the side on which men are in the water should be discontinued at least one-half hour before swimming call is sounded.

LIGHTING

Hygienic lighting connotes adequate illumination, general and focal, with freedom from glare, troublesome shadows, and annoying high lights, to permit reading, writing, required work, or other activity to be performed without avoidable eyestrain. The most important single fundamental factor in lighting is brightness contrast. Adequate general illumination permits sufficiently deep vision into shadows in all parts of the room or compartment so that in glancing up from work the iris will not dilate widely and contract suddenly upon turning back to the work in hand. Moving shadows and flickering light should be prevented. Glare is direct when a source of light comes within the field of vision with the eyes focused upon work, and indirect when light from source is reflected to the eyes by the work or some adjacent object. In general, glare is troublesome if the work itself is not brighter than other objects in the field of vision. Focal lights while undesirable are often necessary. Such lights should ordinarily be placed directly over the work if the plane of work is horizontal; otherwise the location should be such as to afford the best view of the details of the work, while avoiding as much as possible under illumination, glare, and troublesome shadows. Too great concentration at one point in the work field will result in tremendous eyestrain from glare, shadows, and high lights. Places where falls may occur should be adequately illuminated. Focal illumination should be provided for band saws, lathes, grinders, and cutting, mixing, and chopping machines. A sufficient number of lights of adequate candlepower should be maintained in crew's compartments for reading and writing. Individual lights used in focal illumination should be so placed that light rays will not enter directly into the eyes of the worker.

ACCIDENT PREVENTION

The majority of accidents are avoidable. Accidents usually occur because someone fails to observe simple precautionary rules or fails to employ well-known safety measures. Dangerous machinery and electric appliances should have adequate safeguards. All passageways should have adequate illumination. Ladders should have handrails or lines and open hatches should have substantial guards. The Bureau of Ships' Construction and Repair Manual contains much valuable information on safety measures and appliances.

SWIMMING

Caution should be taken, especially when the temperature of the water is below 70° F., to recall men who, not reacting well in the water, develop cyanosis and severe shivering. In the Tropics care should be taken to prevent swimmers from developing severe sunburn. Swimming should not be permitted in water contaminated with sewage.

Chapter IX

QUARANTINE, DISINFECTION, AND BILLS OF HEALTH

Quarantine

The term "quarantine" has its origin from the Italian *quaranta*, meaning 40, this figure representing the number of days for which vessels, beginning early in the fifteenth century, were held under observation on account of the frequent invasions of plague.

The term now means any limitation placed upon the freedom or movement of exposed or contact persons or animals with the object of preventing or controlling the spread of communicable disease. The expression "quarantine methods" is often used to cover all restrictive measures instituted by health officials for the purpose of limiting the spread of disease on land as well as at sea. There is community quarantine when one city or town imposes restrictions upon travelers from some other place in the same country, and border quarantine when the aim is to prevent the introduction of disease over land or across a river from a foreign country. Interstate quarantine is enforced by the Federal Government through the agency of the United States Public Health Service, and consists of routine and special activities planned to limit the spread of disease incident to interstate travel and traffic.

Maritime quarantine includes all measures undertaken by the Government to prevent the introduction of disease through seaports.

The first quarantine station was established at Venice in 1403, on a small island adjoining the city, and had as its basic idea the blind application of the theory of isolation to prevent the spread of plague. Today quarantine stations are to be found in the principal ports of the world at which scientific and accurate periods of detention are in use to prevent the ingress of certain threatened diseases. From the earliest days until the determination of the exact modes of transmission and periods of incubation of the quarantinable diseases, quarantine consisted in more or less rigorous periods of detention, even up to 100 days, with the expectation that in this time the disease, if present, would "wear itself out," or that the "effluvium" would be removed by the influence of sun, rain, frosts, or snows. This haphazard quarantine was extremely expensive, proceeding at times even to burning the entire ship and cargo.

Modern methods of quarantine both on land and sea are based upon known modes of transmission and periods of incubation of certain diseases which are classed as quarantinable. The studies of the last 30 years have

established that many diseases, including all of those known as quarantinable, are due to certain microorganisms or viruses with definite habits of life and capable of growth and multiplication. These so-called pathogenic (disease producing) organisms or viruses may be carried from individual to individual by direct contact with a person sick of the disease or by a carrier, a "carrier" being a person who harbors a pathogenic organism without showing evidence of the disease; they also may exist a relatively short time in or on other than living material as in water, milk, or other food, or they may be transmitted from one human being to another by an intermediary living agent or "vector," as the body louse in typhus, the mosquito in yellow fever, and the flea in transmitting plague to the human being from an infected rat.

After having invaded or attacked a healthy individual, the germs either die or survive. If the latter, a certain number of days must elapse before they have multiplied to sufficient numbers to produce symptoms of disease. This interval of time is known as the period of incubation. This period of incubation varies in length for the different diseases, as well as for the same disease within certain well-defined limits. The period of detention or observation in quarantine is based upon the maximum number of days within which experience has shown the suspected disease will manifest itself if present.

The absence of sickness in the personnel of a vessel does not necessarily mean an absence of infection aboard the vessel. This can be readily understood when it is remembered that a healthy person may carry or harbor the germs of a disease in his body, as, for instance, a cholera carrier, or that the intermediary host may be present without actually coming in contact with the crew, as, for instance, plague-infected rats in cargo under battened hatches. In either event possible contact with an individual on ship or ashore might mean the beginning of an epidemic. It is therefore clear why a vessel may be detained in quarantine, even though there be no sickness among crew or passengers.

The United States Government has declared the following diseases to be quarantinable and subject to quarantine under the provisions of the United States quarantine laws and regulations of the Federal Security Agency, enforced by the United States Public Health Service:

1. Cholera, period of incubation 1 to 5, usually 3 days.
2. Yellow Fever, period of incubation, 3 to 6 days.
3. Smallpox, period of incubation 8 to 16 days.
4. Typhus Fever, period of incubation 5 to 20 days.
5. Leprosy. If the patient is an alien, not permitted to land; if a citizen, the case is dealt with according the State Laws of the port of entry.
6. Plague, period of incubation 3 to 7 days.
7. Anthrax, period of incubation 7 days.

REQUIREMENTS AT FOREIGN AND INSULAR PORTS

Vessels leaving foreign ports and ports in the possessions or other dependencies of the United States for ports in the United States or its possessions or other dependencies are subject to inspection by the officer issuing bills of health whenever, in his opinion, such inspection is necessary to the issuance of a bill of health. United States Quarantine Laws and Regulations require that an inspection be made of—

(*a*) All vessels from ports at which cholera, yellow fever, or plague in men or rodents prevail, or at which smallpox or typhus fever prevails in epidemic form, and at which a medical officer is detailed.

(*b*) All vessels carrying steerage passengers; but if sailing from a healthful port, the inspection need include only such passengers and their living apartments. (See paragraph under General Requirements of the United States Public Health Service at foreign and insular ports.)

Inspection of the vessel is such an examination of the vessel, cargo, passengers, crew, personal effects of same, including examination of manifests and other papers, food and water supply, the ascertainment of its relations with the shore, the manner of loading, and possibilities of invasion by rats and insects as will enable the inspecting officer to determine if these regulations have been complied with.

When an inspection is required, it should be made by daylight, as late as practicable before sailing. The vessel should be inspected before the passengers go aboard, the passengers just before embarkation, and the crew on deck, and no communication should be had with the vessel after such inspection except by permission of the officer issuing the bill of health.

Vessels, prior to stowing cargo or receiving passengers, should be mechanically clean in all parts, especially in the hold, forecastle, and steerage, and loose dunnage in unladened compartments shall be so arranged as to prevent harborage of rodents.

Any portions of the vessel liable to have been infected by any communicable disease should be disinfected before the issuance of the bill of health.

The air space, ventilation, food and water supply, hospital accommodations, and all other matters mentioned therein promotive of the health and comfort of the passengers must be in accordance with the provisions of the act of Congress approved August 2, 1882, entitled "An act to regulate the carriage of passengers by sea."

Bedding, upholstered furniture, soiled wearing apparel, personal effects, and second-hand articles of a similar nature coming from a district known to be infected with smallpox or as to the origin of which no positive evidence can be obtained, and which the consular or medical officer has reason to believe is infected, should be disinfected prior to shipment. Ar-

ticles similar to the above mentioned, if from a district infected by plague or typhus, should be inspected, and, if necessary, treated to destroy vermin.

Articles from an uninfected district shipped through an infected port may be accepted without restriction if not exposed to infection in transit.

Nothing in these regulations shall be construed to modify or nullify in any way existing restrictions promulgated by the Administrator of the Federal Security Agency at the instance of the Secretary of Agriculture for the prevention of the introduction of diseases of animals.

Any article shipped from or through an infected port or place which the consul or medical officer has reason to believe infected, should be disinfected.

Any article presumably infected which cannot be disinfected should not be shipped.

Passengers, for the purpose of these regulations, are divided into two classes, cabin and steerage.

So far as possible passengers should avoid embarking at a port where quarantinable disease prevails, and communication between the vessel and the shore should be reduced to a minimum. In such a port the personnel of the vessel should remain on board during their stay.

No person suffering from a quarantinable disease, or scarlet fever, measles, diphtheria, poliomyelitis (infantile paralysis), influenza, chicken pox, or cerebrospinal meningitis should be allowed to ship.

Passengers and crews, merchandise, and baggage, prior to shipment at a noninfected port but coming from an infected locality should be subject to the same restrictions as are imposed at an infected port.

REQUIREMENTS AT SEA

The master of a vessel should observe the following measures on board his vessel:

(*a*) The water closets, forecastle, bilges, and similar portions of the vessel liable to harbor infection should be frequently cleansed and disinfected.

(*b*) Free ventilation and rigorous cleanliness should be maintained in all portions of the ship during the voyage and measures taken to destroy rats, mice, fleas, flies, mosquitoes, and all vermin.

(*c*) A patient sick of a communicable disease should be isolated and one member of the crew detailed for his care and comfort, who, if practicable, should be immune to the disease.

(*d*) Communication between the patient or his nurse and other persons on board should be reduced to a minimum.

(*e*) Used clothing, body linen, and bedding of the patient and nurse should be immersed at once in boiling water or in a disinfecting solution.

(*f*) The compartment from which the patient was removed should be

disinfected and thoroughly cleansed. Articles liable to convey infection should remain in the compartments during the disinfection when gaseous disinfection is used.

(*g*) Any person suffering from malaria or yellow fever should be kept under mosquito bars and the apartment in which he is confined closely screened with mosquito netting. All mosquitoes on board should be destroyed by fumigation or by the proper use of an accepted insecticide. Mosquito larvæ (wigglers or wiggle tails) should be destroyed in water barrels, casks, and other collections of water about the vessel by the use of petroleum (kerosene); where this is not practicable, the receptacle should be covered by mosquito netting to prevent the exit of mosquitoes from such breeding places.

(*h*) In the case of bubonic plague, special measures must be taken to destroy rats, mice, fleas, and other vermin on board, and in case of pneumonic plague, the patient should be isolated, the body discharges disinfected, especially sputum, and the attendant should wear a mask.

(*i*) In the case of typhus, special measures should be taken to destroy vermin.

(*j*) In the case of cholera, typhoid fever, or dysentery, the drinking water should be boiled and the food thoroughly cooked. The discharges from the patient should be immediately disinfected and thrown overboard.

An inspection of the vessel, including the steerage, should be made once each day.

Should cholera, yellow fever, smallpox, typhus fever, plague, or any other communicable disease appear on board a ship while at sea, those who show symptoms of these diseases should be immediately isolated in a proper place; the captain should note the same in his log, and all of the effects liable to convey infection which have been exposed to infection should be destroyed or disinfected. In the case of smallpox, the entire personnel should be vaccinated.

The compartment used for isolation should be cleansed as soon as it becomes vacant.

The dead, except those dead of yellow fever, should be enveloped in a sheet saturated with one of the strong disinfecting solutions, without previous washing of the body, and at once buried at sea or placed in a coffin hermetically sealed. (See ch. VI.)

A complete clinical record shall be kept of all cases of sickness on board and the record delivered to the quarantine officer at the port of arrival.

The following disinfecting solution is recommended for use at sea:

Formula for disinfecting

Formalin or Formaldehyde (5 Percent)

Formaldehyde solution	50
Water	950

REQUIREMENTS AT UNITED STATES PORT

Every vessel subject to quarantine inspection, entering a port of the United States, its possssions or dependencies, shall be considered in quarantine until given free pratique. Such vessel shall fly a yellow flag at the foremast head and shall observe all the other requirements of vessels actually quarantined. (See arts. 1451, 1452, 1453, N. R.)

Vessels arriving at ports of the United States under the following conditions shall be inspected by a quarantine officer prior to entry:

(*a*) Vessels from a foreign port shall be inspected only at first port of call in the United States, except vessels from ports suspected of yellow fever arriving during the active quarantine season at southern, via northern, ports.

(*b*) Any vessel with sickness on board.

(*c*) Vessels from domestic ports where cholera, plague, or yellow fever prevails, or where smallpox or typhus fever prevails in epidemic form.

The inspection of vessels required by these regulations shall be made between sunrise and sunset, except in case of vessels in distress. Exception may also be made in the case of vessels carrying perishable cargoes, and regular line vessels under regulations approved by the Federal Security Agency.

In making the inspection of a vessel the bill of health and clinical record of all cases treated during the voyage, crew and passengers' lists and manifests, and, when necessary, the ship's log shall be examined. The crew and passengers shall be mustered and examined and compared with the lists and manifests and any discrepancies investigated. The clinical thermometer should be used in the examination of the personnel of vessels under suspicion. When a freight manifest shows that articles requiring disinfection under these regulations are carried by the vessel, a certificate of disinfection, signed by a United States consul or a medical officer of the United States, shall be exhibited and compared with same. If no certificate of disinfection is produced the collector of customs at the port of entry shall be notified of same by the quarantine officer. The collector of customs shall then hold such consignment in a designated place, separate from other freight, pending the arrival of the certificate of disinfection; and in the event of its nonarrival the articles shall be disinfected as hereinbefore prescribed, or shall be returned by the common carrier conveying same.

Medical officers of the United States duly clothed with authority to act as quarantine officers at any port or place within the United States, when performing the said duties, are hereby authorized to take declarations and administer oaths in matters pertaining to the administration of the quarantine laws and regulations of the United States (Act of March 2, 1901, sec. 12).

No person, except the quarantine officer, his employees, or pilots, shall be permitted to board any vessels subject to quarantine inspection until after the vessel has been inspected by the quarantine officer and granted pratique, and all of such persons so boarding such vessel shall, in the discretion of the quarantine officer, be subject to the same restrictions as the personnel of the vessel, or otherwise action may be taken as provided for in section 10, act of March 2, 1901, provided, however, that the United States customs officials must be permitted to board a vessel that has been inspected and held in quarantine for detention or treatment, they being subject to the same restrictions as the personnel of the vessel.

When a vessel arriving at quarantine has on board any of the communicable but nonquarantinable diseases the quarantine officer shall promptly inform the local health authorities of the existence of such disease aboard and shall make every effort to furnish such notification in ample time, if possible, to permit of the case being seen by the local authorities before discharged from the vessel.

QUARANTINE DETENTION

Vessels arriving under the following conditions shall be placed in detention:

(*a*) With quarantinable disease on board or having had such disease on board during the voyage.

(*b*) Any vessel which the quarantine officer considers infected with quarantinable disease.

(c) A vessel arriving at a port south of the southern boundary of Virginia in the season of active quarantine, April 1 to November 1, from a port infected or suspected of infection with yellow fever.

(*d*) Vessels arriving at ports north of this line and south of the southern boundary of Maryland between May 15 and October 1, if from a port infected or suspected of infection with yellow fever.

(*e*) In the case of vessels arriving at a northern port without sickness on board from ports where yellow fever prevails the personnel shall be detained under observation at quarantine to complete six days from the port of departure.

(*f*) Towboats and other vessels having had communication with vessels subjected to quarantine shall themselves be quarantined if they have been exposed to infection.

The duration of detention of vessels or personnel herein contemplated will depend upon the quarantinable disease involved and will hereinafter be specifically provided for.

REQUIREMENTS RELATING TO NAVAL VESSELS

Vessels of the United States Navy which carry a medical officer, upon

entering United States ports from foreign ports, are exempt from quarantine inspection provided that such vessels have not sailed from a port infected with cholera, yellow fever, or plague, or in which typhus or smallpox is epidemic, and further provided that no cases of these quarantinable diseases have occurred on board en route.

Vessels of the United States Navy may be subjected to quarantine inspection upon arrival at ports of the United States, its possessions, or dependencies when coming from a port known or suspected to be infected with cholera, plague, or yellow fever, or where smallpox, or typhus fever is present in epidemic form, and may be detained in quarantine for such disinfection or disinfestation as may be required by reason of disease aboard or exposure to quarantinable disease at the port of departure or call. By arrangement with the Federal Security Agency, ships of the Navy to which medical officers are attached are ordinarily exempt from quarantine inspection. A certificate furnished by the ship's medical officer as to the sanitary condition of the vessel and record of communicable diseases is accepted by the quarantine officer in lieu of actual inspection. In case pratique is granted by radio communication the medical officer upon arrival in port must forward the bill of health in duplicate to the quarantine officer, together with a statement as to sanitary condition, including number of cases of any communicable disease on board.

Vessels of the United States Navy having entered the harbors of infected ports but having held no communication which is liable to convey infection may be exempted from the disinfection and detention imposed on merchant vessels from such ports.

Vessels of the United States Navy not carrying a medical officer shall, upon arrival at ports of the United States from foreign ports, be subject to the same provisions of these regulations as apply to merchant vessels.

No vessel from a foreign port is permitted to enter any port of the United States until pratique has been granted by a United States quarantine official. Until pratique has been granted the vessel is in quarantine and can hold no unauthorized communication with the shore. A merchant vessel cannot enter at the customhouse without presenting the certificate of pratique which shows that the vessel has been released from quarantine.

"G.O. #199 dated 2 Aug. 1943, directs that the importation of parrots on Navy vessels be discontinued. For the purpose of the quarantine regulations, the term 'birds of the parrot family' are held to include all birds commonly known as parrots, Amazons, Mexican double heads, African grays, cockatoos, macaws, parrakeets, love birds, lories, lorikeets, and all similar birds. Birds of the parrot family may harbor a virus dangerous to Naval personnel and in these instances would not be eligible for entry into the United States. In view of the fact that very few of the

naval personnel can comply with quarantine regulations noted in Foreign Quarantine Division Circular Letter No. 67, U. S. Public Health Service, and, as a precaution against introducing psittacosis into the Fleet, it is directed that no person be permitted to take aboard naval vessels any bird of the parrot family."

BILL OF HEALTH

Masters of vessels clearing from or leaving any foreign port or any port in the possessions or other dependencies of the United States for a port in the United States or its possessions or other dependencies must obtain a bill of health, in duplicate, signed by the proper officer or officers of the United States as provided for by law, unless there is no such officer at the port of departure, excepting vessels operating during the absence of quarantinable disease in the foreign ports of call, exclusively between ports in the United States and Alaska and ports in Canada, and exclusively between ports in the United States, and ports in the Bahama Islands and ports in Cuba, and exclusively between ports in the State of California and ports on the west coast of lower California. The provisions of this section shall not apply to vessels plying between foreign ports on or near the frontiers of the United States and ports of the United States adjacent thereto; but the Federal Security Agency is hereby authorized, when, in his discretion it is expedient for the preservation of the public health to establish regulations governing such vessels. Vessels sailing originally from other foreign ports and merely calling at Canadian ports enroute to the United States are not exempt from the provisions of section 2 of the act approved February 15, 1893. During the prevalence of any of the quarantinable diseases at the foreign port of departure, vessels above referred to are required to obtain from the consular officer of the United States, or from the medical officer of the United States, when such officer has been detailed by the President, a bill of health, in duplicate, in the form prescribed by the Administrator of the Federal Security Agency. Guantanamo Bay, Cuba, is considered under the law as a foreign port. A bill of health is required and may be obtained from the medical officer prior to departure. (See art. 1172 N. R. and G. O. 25.) Naval vessels clearing from one United States port for another United States port do not ordinarily procure a bill of health for presentation at the port of arrival. Local or State authority at the port of arrival may, however, require the exhibition of a bill of health under special circumstances, such as when some epidemic disease exists at the port of departure, and under such circumstances it is advisable to procure a bill of health.

A naval vessel departing from a port in the continental United States for a port in the Canal Zone or United States possessions is not required to procure a bill of health or port sanitary statement at such port of de-

parture, except when plague, cholera, or yellow fever exists, or typhus fever or smallpox prevails in epidemic form, in the port of departure.

A naval vessel departing from a port in the possessions or dependencies of the United States for a port in the Canal Zone or other United States possessions is required to procure a bill of health in duplicate at each port of departure.

Bills of health or port sanitary statements are issued in United States ports by medical officers of the Public Health Service where available; otherwise by the collector of customs.

Naval vessels sailing from a United States port to a foreign port shall always procure a bill of health from the proper authorities and have it visaed by the consular or other representative of the country or countries of ports of call, if such ports can be determined upon prior to sailing. It is sometimes advisable to secure bills of health for several ports to which the vessel might go, when definite information of the exact destination is not procurable. A naval vessel sailing from a foreign port to another foreign port shall likewise procure and have visaed a bill of health.

A vessel leaving a foreign port for a home port shall obtain a bill of health from a port official and also a United States consular bill of health, at a port where the issue of consular bills of health is customary, or from the United States Public Health Officer, if one be stationed there.

The form, United States of America bill of health, sets forth under hand and seal of the officer authorized to sign, certification that the vessel has complied with quarantine rules and regulations and leaves the port of issue bound for stated port of the United States via the designated port of call, if any, under circumstances described, including the name of the vessel; nationality; master's name; gross tonnage; net tonnage; medical officer's name; number of officers; number of crew, including petty officers; number of officers' families; number of passengers destined for the United States; number of first cabin, second cabin, and steerage passengers; names of ports visited during the preceding 4 months; statement as to the location of the vessel while in port—wharf, open bay, distance from shore; character of communication with shore; time the vessel was in port; sanitary condition of the vessel; sanitary measures, if any, adopted while in port; sanitary condition of the port and vicinity; and the names of diseases prevailing at the port and in the vicinity. The form also calls for entering the number of cases and number of deaths from each of the quarantinable diseases during the most recent fortnight for which statistics are available, as well as the date of the last case within the preceding year.

Vessels clearing from a foreign port or from any port in the possessions or other dependencies of the United States for any port in the United States, its possessions, or other dependencies, and entering or calling at

intermediate ports, must procure at all such ports a bill of health in duplicate signed by the proper officer or officers of the United States.

Bills of health for naval vessels and indorsement by consular officers are usually extended gratis. Any expense involved in procuring bills of health or in quarantine is a charge against appropriations not under the Bureau of Medicine and Surgery Quarantine expenses (bills of health and **pratique** are a charge against "Instruments and supplies, Bureau of Navigation." (For decision as to the liability of a naval vessel for the payment of quarantine charges growing out of a State law, see Official Opinions of the Attorney General, 1906, vol. 25, p. 234.)

In the United States a bill of health is procured by applying in person to the medical officer of the Public Health Service where available, otherwise to the collector of customs.

In foreign ports request for a bill of health should be made at the office of the captain of the port (Bureau du Capitaine du Port, Offizio dell Capitano dell Porto, Capitania del Puerto).

The person applying for the bill of health should take with him bills of health from last port of departure and be prepared to furnish the necessary data therefor.

If epidemic or contagious diseases are present in the port at the time of making the request, a visit should also be made to the consul of the nationality of the next port of call, particularly in the Mediterranean, for his visas.

On entering port, in addition to the bill of health, the ship shall be prepared to furnish the quarantine officer, if required, with a statement relative to the health conditions prevailing on board ship. Certain diseases of a communicable or infectious character, not included among the quarantinable diseases under the quarantine laws and regulations of the Federal Security Agency, such as the exanthemata, diphtheria, cerebrospinal fever etc., will ordinarily be viewed by local or State authorities as constituting quarantinable diseases and their presence on board should be considered as rendering the vessel subject to quarantine restrictions. All such diseases should be fully reported to the inspecting health officer.

The officer issuing the bill of health to vessels leaving foreign ports and ports in the possessions or other dependencies of the United States for ports in the United States or its possessions or other dependencies is required to satisfy himself, by inspection if necessary, that the conditions certified to therein are true. He is authorized, in accordance with law, to withhold the bill of health until he is satisfied that the vessel, the passengers, the crew and the cargo have complied with all the quarantine laws and regulations of the United States.

Special Quarantine Measures

CHOLERA

This disease is caused by a germ, the vibrio comma, when introduced into the gastrointestinal tract. Food or water indirectly contaminated is the chief means by which the disease is conveyed, but on board ship direct contact or the immediate pollution of alimentary substances by "carriers" or acute cases are to be considered the more common means by which the cholera infection is transmitted. The possibility of water ballast being infected or constituting a probable source of spreading the disease is so remote as to be negligible, and the same applies in a general way to cargo and ship supplies. Accurate knowledge that none of the personnel is harboring cholera organisms in his gastrointestinal tract is the most important feature in the treatment of cholera-infected vessels.

In cholera the control of the human host and the safe disposal of the excreta therefrom, the destruction of contaminated food or water, or their sterilization—cooking, boiling, etc.—are the essential features in preventive measures. Fumigation or place disinfection is not called for in cholera preventive measures. Where a case of cholera has resulted in soiling the bedding, as an added precaution such effects should be sterilized and the floors and walls of the compartment washed down with formaldehyde solution. The cholera vibrio has practically no resistance to drying, however, and under natural conditions it is improbable that soiled linen or an infected place will result in the spread of the disease. While bathing and personal cleanliness is to be encouraged at the quarantine station, it is not to be assumed that disinfection of wearing apparel and personal effects of the contacts or the disinfection of the body has any material effect in preventing the spread of the infection. The control of the personnel and the assured safe disposal of body discharges and protection of food and water supply are the important features to be observed in the prevention of cholera.

MEASURES AGAINST CHOLERA AT FOREIGN AND INSULAR PORTS

At ports where cholera prevails special care should be taken to prevent the water and the food supply from being infected. The drinking water, unless of known purity, should be boiled and the food thoroughly cooked and protected against contamination by flies, etc.

The latrines of vessels must be so arranged that they, including their discharge pipes, can be made and kept mechanically clean.

Certain food products that are ordinarily consumed in an uncooked state coming from cholera-infected localities or through such localities, if exposed to infection therein, should not be shipped. Vegetables ordinarily eaten in an uncooked state when grown in districts where cholera pre-

vails shall not be shipped. Fruits grown on trees or on shrubs may be shipped.

The baggage of steerage passengers shall be inspected, and no food shall be taken aboard in such baggage.

Steerage passengers and crew coming from cholera-infected districts should be subjected to bacteriological examination or otherwise detained 5 days in an environment known to be free from any source of infection.

Steerage passengers and crew from districts not infected with cholera, shipping at a port infected with cholera, unless passed through without danger of infection, should be treated as those in the last paragraph.

Cabin passengers coming from cholera-infected districts should produce satisfactory evidence as to their exact place of abode during the 5 days immediately preceding embarkation. If it appears that they have been exposed to infection, they shall be detained under medical supervision a sufficient time to cover the period of incubation since last exposure, or otherwise be subjected to bacteriological examination.

Should cholera appear in the barracks or houses in which passengers are undergoing detention, no passengers from said houses or barracks who have been previously exposed to this new infection should embark until they have been determined free of the infection by bacteriological examination or otherwise isolated for a period of 5 days.

MEASURES AGAINST CHOLERA AT DOMESTIC PORTS

Special measures shall be employed against vessels and persons from a cholera-infected place, as likewise when cholera has appeared on board during the voyage.

All steerage passengers arriving at ports in the United States, its possessions or dependencies, from ports or places where cholera prevails, shall be subjected to bacteriological examination and shall not be admitted to entry until it has been determined by said examination that they are free from cholera vibrios.

All persons on vessels upon which cholera has appeared during the voyage shall upon arrival at quarantine be detained until it has been determined by bacteriological examination that they are free from cholera vibrios.

Persons in detention who are proven by bacteriological examination (performed not less than 24 hours after removal from exposure to infection in cholera case or carrier) to be free from cholera organisms may be discharged from quarantine without further detention.

In lieu of bacteriological examination (and then only when it is impracticable) persons exposed to infection in a cholera case or carrier shall be detained in quarantine five days after being isolated from such case or carrier.

If a case clinically diagnosed as cholera has occurred on voyage, or if bacteriological examination should reveal the presence of infection in any person on board, such infected person or persons should be removed and isolated. All contacts should be segregated in small groups, and no material capable of conveying infection shall be removed from the ship.

Fruits and vegetables from an infected ship, that are ordinarily consumed in an uncooked state, shall be destroyed or rendered harmless by cooking.

The food served to persons in quarantine, unless from a source known to be free from cholera infection, shall be cooked.

The water supply of a vessel detained in quarantine on account of cholera infection, unless determined by bacteriological examination to be free from cholera organisms or the organism *B. coli,* shall be sterilized. Otherwise it shall be discharged after disinfection.

The dejecta of all persons in quarantine on account of cholera shall be disinfected before final disposition, and special precautions shall be exercised in order to prevent the contamination of food or water supply or the spread of the infection through the agency of flies or other insects.

Personal effects contaminated by dejecta from a cholera case or carrier shall be disinfected.

Any part of the ship that has been contaminated by dejecta from a cholera case or carrier shall be washed down with a solution of formaldehyde solution.

Carriers or recovered cases shall not be released from quarantine detention until three bacteriological tests performed on consecutive days shall have been proven to be negative.

Inoculation with cholera vaccine of persons liable to be exposed should be considered because active artificial immunity for about 1 year is probable.

YELLOW FEVER

The causative agent of this disease is a filtrable virus, ordinarily transmitted to man by a species of mosquito; i. e., *Aedes aegypti* and this only after an intrinsic cycle of development in the body of such mosquito, which requires about 12 days. It has been found that a number of mosquitoes other than *A. aegypti* are capable of transmitting yellow fever by bite under certain environmental conditions found in and near tropical forests in the complete absence of *A. aegypti,* and it is then called jungle yellow fever. The mosquito can acquire the virus by sucking blood from a patient ill with yellow fever only during the first 3 days of the disease.

Immunes are those who have had yellow fever or have been vaccinated against yellow fever within the past two years. One attack confers lasting active immunity for life. Children often have a mild unrecognized at-

tack and are immune thereafter. Passive immunity of brief duration may be conferred by convalescent serum, and artificial active immunity of prolonged duration is now being practiced by the subcutaneous injection of a living virus modified by prolonged passage through chick embryos.

The only procedure that is called for in preventing the spread of yellow fever (aside from the control of the human host) is that for the destruction of mosquitoes, and this is best accomplished by fumigation with sulfur dioxide or hydrocyanic acid gas. Bactericidal measures have no place in the prevention or destruction of yellow fever infection.

MEASURES AGAINST YELLOW FEVER AT FOREIGN AND INSULAR PORTS

For the purpose of these regulations 6 days shall be considered as the period of incubation of yellow fever.

It is advisable that at ports where yellow fever prevails precautions should be taken to prevent the introduction of mosquitoes, *A. aegypti,* on board the vessel. Water tanks, water buckets, and other collections of water about the vessel should be guarded in such a manner that they shall not become breeding places for mosquitoes. Where the vessel has lain in such proximity to the shore at such places as to render it liable in the opinion of the inspecting officer, to the access of *A. aegypti* measures should be taken to destroy mosquitoes that may have come on board.

Passengers and crew who, in the opinion of the inspecting officer, have been definitely exposed to the infection of yellow fever (i. e., as from a house or locality known to be infected) should not be allowed to embark for 6 days after said exposure. Those immune to yellow fever are exempt from this provision.

MEASURES AGAINST YELLOW FEVER AT DOMESTIC AND INSULAR PORTS OF ARRIVAL

A vessel aboard which a case of yellow fever has occurred at any time during the voyage shall be treated as follows:

(*a*) Careful visual and thermometric inspection of all persons.

(*b*) The sick are to be immediately disembarked, protected by netting against the access of Aëdes mosquitoes, and transferred to a place of isolation.

(*c*) Other persons should be disembarked, if possible, and detained under observation for 6 days, dating from the day of last possible exposure.

(*d*) Persons under observation presenting an elevation of temperature above 37.6° C. (99.7° F.) shall be isolated in a screened apartment.

(*e*) The ship shall be moored, if possible, at least 200 meters from the inhabited shore.

(*f*) The ship shall be fumigated for the destruction of mosquitoes before the discharge of cargo, if possible. If a fumigation be not possible before the discharge of the cargo, the discharge of cargo shall be under the supervision of the quarantine officer and may be permitted as follows: By (1) the employment of immune persons for discharging the cargo; or (2) if nonimmunes be employed, they shall be kept under observation during the discharging of cargo and for 6 days, to date from the last day of exposure on board.

A vessel which has lain in such proximity to the shore of a port known to be infected as to render it liable to the access of Aëdes mosquitoes shall be fumigated and the personnel held in detention under observation for 6 days.

A vessel arriving at a southern port (either direct or by way of a northern port of the United States) which, although coming from an infected port or suspected port, has had neither death nor case of yellow fever on board, either before departure, during the voyage, or at the time of arrival and which the quarantine officer is satisfied has not lain in such proximity to the shore as to render it liable to the access of Aëdes mosquitoes, or which has been fumigated under the supervision of an accredited medical officer of the United States immediately before sailing, may, upon arrival at a port of destination in the United States with good sanitary history and in good condition (including the absence of any exposed collection of water in which *A. aegypti* might breed) be subjected to the following treatment:

(*a*) If arriving in 6 days or less, she may be admitted to pratique with or without fumigation, in the discretion of the quarantine officer, and without further detention than is necessary to complete the 6 days.

(*b*) If arriving after 6 days, she shall be immediately fumigated (unless previously fumigated at a northern port) and may be admitted without detention.

Vessels from ports infected or suspected of infection with yellow fever, calling at ports south of the southern boundary of Virginia, April 1 to November 1, or at a port north of that line and south of the southern boundary of Maryland, between May 15 and October 1, for bunker coal or supplies during the active quarantine season, may be allowed to take on such cargo after fumigation, provided the vessel be anchored in a place inaccessible to Aëdes and the crew or passengers be detained on board.

Traffic without detention may be allowed during the active quarantine season from ports infected or suspected of infection with yellow fever to ports in the United States south of the southern boundary of Maryland under the following conditions:

(*a*) The vessel must lie at approved moorings in the open harbor;

the crew must not be allowed ashore at the port of departure. Every possible precaution must be taken to prevent the ingress of Aëdes mosquitoes and their access to the crew.

(*b*) The officer who must go ashore to contact authorities in an infected port must be immune to yellow fever. Passengers unless immune to yellow fever must have been free from possible exposure to yellow fever for 6 days immediately prior to embarking.

(*c*) All the above conditions to be certified to specifically by an accredited medical officer of the United States.

All persons who can prove their immunity to yellow fever or who have not been exposed to possible infection of yellow fever may be permitted to land at once.

PLAGUE

This disease is caused by the *Pasteurella pestis*. The bubonic type (called bubonic plague) is the most common form of the disease and is transmitted to man through the agency of rats and mice and their ectoparasites; i. e., fleas. It is primarily and essentially a disease of rodents. It is only accidentally transmitted to the human by means of the fleas which have fed on an infected rodent host and which, having become dislodged and finding no other preferred host available, perforce turn to the human as the only source of blood supply. It is alleged that the bedbug may transmit the disease. In any event, the bedbug would cause only individual cases of the disease and would not be productive of an epidemic or operate to the widespread dissemination of the disease. The bubonic type is not communicable from person to person.

From the foregoing, therefore, it is evident that the treatment of plague-infected vessels calls for the definite destruction of all rodents and their parasites and bedbugs where there have been septicemic types of the disease. While fleas normally have their habitat on their preferred host, it must be borne in mind that these parasites may occasionally be dislodged and temporarily be found in the environment. When rodent infection has actually been demonstrated on board a vessel, consideration should be given to the destruction of rats, mice, and fleas in all parts of the vessel by some disinfecting agent which will penetrate to all parts of the vessel and will be toxic both to animal and insect life. Sulfur dioxide and hydrocyanic acid gas are best adapted for this purpose. When human cases are found on vessels that have acquired their infection en route, indicating the dispersal of infected fleas, it may be advisable that the clothing and personal effects of the passengers and crew be treated for the destruction of any fleas that may have become lodged thereon.

Disinfection for the purpose of destroying bacteria for the prevention of bubonic plague is irrational and unnecessary. General preventive

measures also include: Methodical destruction of rats and other rodents living in the wild state in area of endemic rodent infection; examination of carcasses for the detection of plague; rat-proofing of buildings and elimination of breeding places; guarding of grains and other food materials against access to rats; investigation of all deaths during an epidemic, with autopsy and laboratory examination when indicated. Passive immunity of 3 to 4 weeks' duration is conferred by antiplague serum. Plague vaccine usually confers active immunity of about 6 months' duration.

The pneumonic type (called *pneumonic plague*) is intensely communicable during the course of the disease; susceptibility is general; it is transmitted solely through personal contact in the same fashion as pneumonia or other respiratory diseases. Neither the flea nor other insects are concerned in the direct transmission of pneumonic plague. From an epidemiological standpoint and as to the application of preventive measures, pneumonic plague and bubonic plague are to be considered wholly separate diseases.

MEASURES AGAINST PLAGUE AT FOREIGN AND INSULAR PORTS

At ports or places suspected of plague infection in rodents every precaution shall be taken to prevent rats, mice, and fleas from getting aboard.

Vessels sailing from such ports shall be simultaneously fumigated in all parts, preferably when empty, for the destruction of rats. Lighters should be free of rats, and this is best accomplished by periodic fumigation.

If the vessel lies at a dock all connecting lines should be guarded by inverted cones or disks not less than 3 feet in diameter and so fixed as to be always at a right angle to the line to which it is attached.

Articles which harbor or are liable to harbor rats or rat fleas should not be shipped until freed of such vermin, either by the use of chemicals, fumigation, or by preventing the access of rats. The nature of the merchandise and the place and method of stowing prior to shipment must be considered in determining its liability to be a rat or vermin carrier, thus: Crated cargo, bags of grain, etc., so stowed as to be used as nesting places for rats would be flea, and might be rat, carriers, and cargo should preferably have been previously stored in ratproof warehouses. Articles of cargo in open crates should be carefully inspected to determine freedom from rats and, at the discretion of the inspector, may be rejected for shipment if considered as rodent infested. When the cargo of a vessel consists of grain or other rat food, extra precautions should be taken to prevent rats from going aboard.

MEASURES AGAINST PLAGUE AT PORT OF ARRIVAL

Ships on which plague has occurred in men or rodents shall be de-

tained in quarantine, the sick, if any, shall be removed and isolated, and the destruction of rats shall be effected as soon as practicable.

A plague-infected ship shall be fumigated simultaneously in all parts for the destruction of rats, including those that may be within articles of cargo, and other precautions shall in the meantime be observed to prevent the escape of rats from the ship.

All rodents destroyed on vessels at quarantine, shall when practicable, be bacteriologically examined.

All persons sick of plague shall be detained in quarantine until well, but no detention of healthy contacts is contemplated (except in the pneumonic type of the disease), other than is incidental to the treatment of vessels or cargo.

If pneumonic plague has occurred on board ship during the voyage, the sick shall be removed and isolated and all crew and passengers that have been exposed to the infection shall be detained in quarantine for a period of 7 days, or, at the discretion of the quarantine officer, until their secretions shall be proved to be free from *P. pestis*.

The quarantine officer, before granting pratique to a vessel that has been detained in quarantine on account of plague infection, shall assure himself that the vessel is free from rats and vermin.

The personal effects in use and the belongings of crew and passengers which in the opinion of the quarantine officer are considered as infected shall be disinfected and rendered free from vermin.

Vessels from foreign ports or ports in the possessions or dependencies of the United States or domestic ports that are known or suspected of being infected with plague may, when loaded with cargo the nature of which or manner of storage precludes effective fumigation, be permitted to enter subject to the terms of a provisional pratique. When lying alongside wharf or dock at United States ports such vessels shall take proper precautions to prevent the passage of rodents. The vessel shall be fended off from wharf or dock not less than 4 feet, and on all connecting lines shall be fixed rat guards of sheet metal of an approved design not less than 3 feet in diameter. All cargo nets and similar devices extending between the vessel and shore structures shall be removed at night unless in actual use, as likewise gangways and ladders, unless guarded. Any vessel so entering and neglecting to effectively apply such measures may, at the discretion of the Surgeon General, be remanded to the quarantine station for discharge of cargo or required to discharge cargo at anchor well removed from the wharf.

Vessels from ports known to be infected with plague in man or rodents which have docked or which have not taken precautions necessary to prevent the ingress of rats and on which effective measures have not been taken to destroy the same under the supervision of an accredited medical

officer of the United States Government shall, upon arrival at a port in the United States, be fumigated for the destruction of rats.

All vessels engaged in trade with foreign ports shall be fumigated not less than once every 6 months for the purpose of destroying rats. This is best done when the vessel is empty. The periods may be extended for vessels plying regularly between ports not infected with plague and for vessels whose construction does not favor harborage of rats.

A certificate signed or visaed by an accredited medical or consular officer of the United States may be accepted by the quarantine officer as competent evidence as to the last fumigation, provided such certificate contains the same, or substantially as complete information as contained in Certificate of Fumigation, United States Public Health Service, Form 1939 or Form 1945.

In applying plague-preventive measures vessels without cargo shall be fumigated simultaneously in all parts with sulfur-dioxide gas, not less than 3 pounds per 1,000 cubic feet, for 6 hours' exposure, or by hydrocyanic-acid gas in the proportion of 5 ounces of sodium cyanide per 1,000 cubic feet of space (or equivalent amount of potasium cyanide) for 2 hours. If the vessel be loaded, the time of exposure shall be doubled.

When necessary in the treatment of infected vessels, the quarantine officer may require the master to partially discharge cargo for the purpose of effective performance of fumigation.

SMALLPOX

The causative agent of this disease is a specific filtrable virus and for all practical purposes it may be considered that more or less intimacy of contact is essential for the spread of the disease. It should also be borne in mind that immune contacts or convalescents may transmit the virus in either their clothing, their personal effects, or possibly in the body secretions.

MEASURES AGAINST SMALLPOX AT FOREIGN AND INSULAR PORTS

For the purpose of these regulations 14 days shall be considered as the incubation period of smallpox.

Passengers and crew coming from districts where smallpox prevails in epidemic form, or who have been exposed to smallpox, should be vaccinated before embarkation, unless they show satisfactory evidence of having acquired immunity to smallpox by previous attack, or successful vaccination within 1 year, and their baggage inspected and, if necessary, disinfected.

MEASURES AGAINST SMALLPOX AT PORT OF ARRIVAL

Vessels arriving with smallpox on board, or having had smallpox on board during the voyage, shall be treated as follows:

(*a*) The sick be removed and detained until recovered.

(*b*) All persons who in the opinion of the quarantine officer have been been exposed to the infection shall be vaccinated, unless protected by a previous attack of smallpox, and detained in quarantine until the vaccination is protective against said exposure or, if they refuse vaccination, detained in quarantine for 14 days after last exposure to the infection.

(*c*) Those persons that have not been exposed to the infection may be released.

(*d*) All personal effects of passengers and crew that have been exposed to infection shall be disinfected. All compartments that have been exposed to the liability of infection shall be disinfected.

TYPHUS FEVER

The causative organism of this disease is believed to be a microorganism known as the *Rickettsia prowazeki*. The transmitting agent of typhus, however, is the louse, both the body louse and the head louse, chiefly the former, and in some outbreaks, fleas.

Rats, as well as infected persons, may be a transmission factor and their destruction is therefore an indicated general measure of prevention, along with the operation of facilities for the delousing of persons, clothing, and premises. No other natural means of transmission of typhus infection has been accepted.

The important feature in typhus-preventive measures is the assured destruction of all vermin on the person, clothing, and personal effects of those actually sick with typhus and those who have been in contact with typhus-infected persons. In this latter group are to be included those persons from a known typhus-infected area. The destruction of lice on clothing is best effected by heat, steam under pressure by preference, but flowing steam without pressure will suffice, provided the articles to be disinfected are not closely packed. Dry heat is likewise effective. Body lice and head lice can very well be destroyed by mechanical cleaning—soap and hot water. Then follow the treatment given in the paragraph on the treatment of vermin. The treatment of personal effects and baggage of verminous persons is necessary, but in the case of those individuals who are passed free of vermin and not requiring disinfection their baggage likewise should be passed without treatment. Bactericidal measures are not called for in typhus prevention. The question is solely that of the destruction of lice and rat fleas and the detention in quarantine for a period of 12 days of those persons who have been intimately ex-

posed to typhus infection and who presumably may develop the disease, as well as those actually sick.

MEASURES AGAINST TYPHUS FEVER AT FOREIGN AND INSULAR PORTS

For the purpose of these regulations 12 days shall be considered as the period of incubation for typhus fever.

Passengers and crew from ports infected with typhus shall not be allowed to embark unless demonstrably free from vermin, or otherwise treated for the destruction of vermin. The personal effects, wearing apparel, and baggage of those infested with vermin shall be disinfected.

Passengers from localities where typhus prevails embarking at a port not infected with typhus shall be treated as in the preceding paragraph.

Passengers and crew who, in the opinion of the inspecting officer, have been definitely exposed to infection (from a house, barracks, or other building in which has occurred a case of typhus) shall not be allowed to embark until 12 days after removal from the infected environment.

MEASURES AGAINST TYPHUS FEVER AT PORT OF ARRIVAL

Vessels on which typhus infection has occurred shall be detained in quarantine and the sick, if any, removed and isolated. The clothing, personal effects, and baggage of those infected and of those not demonstrably vermin free shall be treated for the destruction of vermin.

All persons found to be vermin (louse) infested shall be treated for destruction of lice.

All passengers and crew that have been exposed to the infection shall be detained under observation for a period of 12 days from last exposure to infection.

Those of the personnel that are demonstrably free from vermin and have not been exposed to the infection may be released without detention or disinfection of baggage.

Vessels on which typhus has appeared shall be detained and fumigated for destruction of vermin.

Cargo compartments of typhus-infected vessels need not be fumigated unless there be exceptional conditions that may render them vermin infested.

Sulphur dioxide and hydrocyanic acid gas are effective agents for the destruction of lice when used in proper strength and exposure, but must only be used under the supervision of the U. S. Public Health Service or a naval doctor.

LEPROSY

The causative agent of this disease is believed to be *Mycobacterium*

leprae, which is an "acid fast" bacillus found in the tissues of persons having the disease.

The incubation period is long and may extend to several years. The conditions and circumstances under which transmission occurs are not completely understood and preventive measures are confined almost entirely to the isolation and segregation of the leprous persons.

For the prevention of the spread of leprosy, the chief and practically the only measure called for is the isolation of the patient, either in a national or State leprosarium. When in temporary confinement at the quarantine stations, when traveling, or under other conditions that would entail contact with the public, especial precautions would include the sterilization of eating utensils used by the leper and the disinfection of bedclothes. Terminal disinfection consists of thorough cleansing of the patient's living premises. No immunization method is recognized and quarantine of contacts is not contemplated.

Alien lepers are not permitted to embark at a foreign port for a port of the United States, its possessions or dependencies, either as a passenger or as a member of the crew, or if discovered on board, the case shall be certified as a leper and reported to the nearest commissioner of immigration. If the leper be a citizen of the United States, the case shall promptly be reported to the Navy Department, if transportation in a naval vessel is involved.

ANTHRAX

Quarantine regulations contemplate that anthrax is primarily a disease of animals, not transmitted from man to man, and that responsibility for exclusion of the disease rests upon the United States Bureau of Animal Industry. It was designated a quarantinable disease to afford additional protection from infection from imported animal products, especially hair and bristles for shaving brushes. It is required that shaving brushes destined for shipment to the United States be made only from hair or bristles known to be free from anthrax spores, or that such hair or bristles before being made into brushes shall be disinfected by one of three methods: (1) Boiling for 3 hours; (2) autoclaving for 30 minutes at 15 pounds pressure with preliminary vacuum of at least 10 inches; and (3) exposure to streaming steam for 6 hours.

DISINFECTION AND FUMIGATION

The distinction between disinfection and fumigation must be kept clearly in mind. Disinfection properly applied is of great value in the prevention of communicable diseases. With the destruction of infective discharges and the exercise of great care and cleanliness throughout the course of a communicable disease there is less need for terminal disinfection. The boiling of sheets, pajamas, towels, and similar articles and a

thorough scrubbing of the surfaces with hot water and soap, and disinfecting of bedding with steam is a more effective method of disinfection than by the use of one of the gaseous agents. Gaseous fumigation for the destruction of bacteria and viruses had been discontinued. Gases, such as formaldehyde, are uncertain in practice and have the merest surface action and cannot be depended on against tuberculosis or diphtheria. Fumigation has its place in preventive medicine and is used principally for the destruction of rodents in the control of plague, the extermination of insects, especially bedbugs, and, in exceptional instances, for the extermination of mosquitoes as a disease-prevention measure.

The agents used in disinfection are of two types, physical and chemical.

PHYSICAL DISINFECTANTS

Cleansing with soap and water.—The liberal and energetic use of soap and hot water will mechanically remove a high percentage of bacteria from the hands as well as from contaminated articles such as furniture, door knobs, bed frames, and all washable materials. Consequently, this measure is always to be carried out thoroughly preliminary to or in connection with other methods of disinfection.

Exposure to direct sunlight in fresh outdoor air.—Such exposure for several hours is always desirable, paritcularly for clothing and bedding and other articles which may not, or in the particular instance need not, be treated more energetically. Bright sunlight which has not penetrated a glass window, and hence had the ultra violet rays filtered out, will kill the common disease producing bacterial organisms in a few hours. Also these organisms cannot withstand the complete drying that takes place in the fresh air. The tubercle bacillus, the virus of chickenpox, the virus of smallpox, and, in general, all spore-bearing bacteria are more resistant to sunlight and drying. Thirty hours of sunning is usually required to kill an anthrax spore.

Burning.—Of unquestioned efficacy, but seldom required.

Boiling.—Very efficient and of wide range of applicability. The articles must be wholly immersed for not less than 10 minutes in water actually boiling (100° C.). The addition of 1 percent of carbonate of soda renders the process applicable to polished steel, cutting instruments, or tools.

Steam.—(*a*) Flowing steam (not under pressure): Flowing steam when applied under suitable conditions is an efficient disinfecting agent. The exposure must be continued 30 minutes after the temperature has reached 100° C.

(*b*) Steam under pressure without vacuum: Steam under pressure will sterilize, provided that the process is continued 20 minutes after the pressure reaches 15 pounds per square inch. The air must be expelled from

the apparatus at the beginning of the process. If impracticable to obtain the designated pressure, a longer exposure will accomplish the same result.

(*c*) Steam under pressure with vacuum: Steam in a special apparatus with vacuum attachment is the best method of applying steam under pressure, the object of the vacuum apparatus being to expel the air and to promote the penetration of the steam. The process is to be continued for 20 minutes after the pressure reaches 10 pounds to the square inch.

Clothing, fabrics, textiles, curtains, hangings, etc., may be treated by any of the above methods as circumstances may demand.

Articles injured by steam, such as leather, furs, skins, rubber, trunks, valises, hats and caps, bound books, silks, and fine woolens should not be disinfected by steam. Such articles should be disinfected by formaldehyde gas or any of the chemical disinfecting agents mentioned next which may be applicable thereto. Those which will be injured by wetting should be disinfected by a gaseous agent.

Textiles which are soiled with discharges of the sick or which are presumably deeply infected must be disinfected by one of the following methods: (1) Boiling, (2) steam, (3) immersion in one of the germicidal solutions.

Cooking and eating utensils should always be disinfected by immersion in boiling water or by steam. Chloride of lime may be used in an emergency.

CHEMICAL DISINFECTANT SOLUTIONS

Chemical disinfectants not supplied in the medicine box may be obtained from the supply officer for general use aboard naval vessels.

Cresol.—Cresol, a mixture of cresols derived from coal tar, in the strength of 5 percent may be substituted for bichloride of mercury, and should be employed in the disinfection of contaminated clothing or fabrics, on swabs for sides and decks of cabins and living spaces of ships to obviate injurious action on metal surfaces, bright work, etc., and for feces, urine, sputum and spitkits. Exposure should be 1 hour. Fingers should not be immersed in this solution for any length of time as numbness will result and if immersion is continued gangrene may follow. Its action is similar to carbolic acid.

Formaldehyde solution (formalin).—Formaldehyde, a watery solution, containing about 40 percent of formaldehyde gas, may be used in a 5-percent solution as a substitute for bichloride of mercury or carbolic acid and is useful for the disinfection of surfaces, dejecta, fabrics, and a great variety of objects, owing to its noninjurious character. It is an excellent deodorant. Formaldehyde solutions act harshly upon the hands.

Chlorinated lime.—Chlorinated lime in a 5- or 6-percent solution freshly made from the powder which has been kept free from deterioration in

a small sealed can or tightly stopped colored bottle is efficient and useful in the disinfection of sewage, stools, glass and earthen ware, and materials or articles which will not be damaged by its bleaching and corrosive action. When the package containing the chlorinated lime is opened there should be a strong odor of chlorine. It can be used for washing painted surfaces and scrubbing floors, in water-closet bowls or urinals, and in shower baths to prevent the spread of ringworm. It serves as a deodorant as well as a disinfectant. It may be used by attendants upon the sick to disinfect their hands. In disinfecting dejecta, stools should be completely covered with the solution, thoroughly mixed and allowed to stand for at least 30 minutes. The powder may be sprinkled over the stool, taking care to add sufficient in excess so that a 5-percent solution will result when thoroughly mixed.

In making a solution for use, one-half pound of commercial chlorinated lime or "bleach" is to be dissolved in a gallon of water. The insoluble residue sinks to the bottom; the solution above contains about 6 percent of chlorinated lime which is equivalent to 2 percent of chlorine, the active disinfecting agent. Chlorinated lime cannot be depended upon to kill the tubercle bacillus.

Disinfection of drinking water by chlorination.—Dissolve the soluble portions of 1 gram of chlorinated lime of tested chlorine strength in a small volume of water and add this to 40 gallons of the water to be disinfected; mix thoroughly and allow to stand for at least 1 hour before using for drinking purposes.

FUMIGANTS

If it should be considered necessary to fumigate, facilities of the United States Public Health quarantine station should be sought, or similar public health facilities, if in a foreign port. In their absence, contact should be made with a naval vessel having a regular medical department.

FUMIGATION OF VESSELS

All spaces to be fumigated must be made as nearly airtight as possible. In fumigating the holds of vessels the hatches should be covered over with their regular waterproof tarpaulins and tightly battened down, leaving a corner that can be opened as a vent for the escape of the fumes. All air slits, scuttles, and chain ports should be closed. Doors should be sealed by means of strips of paper pasted over the cracks left between the frame and the door. All machinery and bright metal should be wiped over with vaseline in advance. All possible care should be observed to see that dead space in the vessel is opened up and all practical measures should be taken to aid in the diffusion of the fumigating gas, and this is especially important when sulfur dioxide is used. Pipe casings should be opened up and from one end of the vessel to the other there should be a certain number

of limber boards removed so as to permit of penetration of the gas into the bilges. Any planked-over space between the outer and the inner sheathing of a vessel should also be freely opened, and wherever there is dead space it should be opened up so that there will be free circulation of the gas. Careful attention should be given to lifeboats, which are often infested with rats which resort to these places for water. Preferably, lifeboats should be cleaned and flooded by water prior to fumigation. Very close attention should be given to the poop deck, which is a space frequently containing a heterogeneous collection of litter and is generally badly rat infested. In general, the engine room and fireroom do not harbor rats, but in the treatment of a vessel infested with plague-infected rats they should be fumigated. Be sure all personnel have been removed from the area to be fumigated or likely to be exposed to the fumes.

DISINFECTING PLANTS

The following-named quarantine stations of the United States Public Health Service are prepared to perform disinfection and fumigation when called upon. At some of the smaller stations a reasonable length of notice should be given in order that the fumigating materials may be procured. The fact that some of the stations are not provided with wharfage facilities is not an index to the capacity of the stations for performing disinfection:

Station	Depth of water at dock, feet	Detention facilities (barracks), persons	Hospital beds
Astoria, Oreg.			
Baltimore, Md.[1]	8	100	12
Boston, Mass.[1]	15	1,400	65
Brownsville, Tex.[1]			
Wilmington, N. C.[2]			
Charleston, S. C.[1]	22	80	5
El Paso, Tex.[1]			
Fort Monroe, Va. (Craney Island)[1]	10	1,000	25
Galveston, Tex.[1]	25	69	15
Gulf, Miss.[2]	7	20	10
Honolulu, T. H.[1]	18	1,000	31
Laredo, Tex.[1]			
Los Angeles, Calif.	35	6	
Marcus Hook, Pa. (Reedy Island)[1]			
Miami, Fla.	18		
Mobile, Ala.	35	65	15
New Orleans, La.[1]	25	200	30
New York, N. Y.			
Pensacola, Fla.[2]			
Portland, Maine[2]			
Port Townsend, Wash.[1]	12	200	25
Reedy Island, Del.[1]	6	200	15
Sabine Pass, Tex.[1]	30		40
San Diego, Calif.[1,2]	22	80	18
San Francisco, Calif[1]	19	600	10
San Juan, P. R.[1]	12	75	8
Savannah, Ga.[2]			
Substations:[2]			
Beverly, Mass.			
Lynn, Mass.			
Perth Amboy, N. J.			
Salem, Mass.			
San Ysidro, Calif.			
Tampa Bay, Fla.	12	30	10

[1] Stations having disinfecting plants.
[2] Stations having fumigating service obtainable from other principal stations.

GLOSSARY

ABDOMEN.—That part of the body which lies below the chest as far as the pelvis and contains stomach, liver, intestine, etc.; the belly.

ALBUMINOUS.—Containing albumin or protein: e. g., meat, egg, milk, etc., and certain materials in bodies of plants and animals.

ANALGESIC.—A medicine that relieves pain.

ANESTHETIC.—A medicine used to produce local or general insensibility.

ANODYNE.—A medicine that soothes irritated nerves.

ANTACID.—A medicine correcting or neutralizing acidity.

ANTIDOTE.—A medicine given to counteract some action in another, or to neutralize the effect of a poison.

ANTIMALARIAL.—Curing or preventing malaria.

ANTIPYRETIC.—A remedy for fever.

ANTIRHEUMATIC.—Relieving or preventing rheumatism.

ANTISEPTIC.—A substance which prevents or retards the growth of organisms, especially of the septic variety, thus hindering putrefaction.

ANTISPASMODIC.—An agent that relieves nervous irritability and minor spasms.

ASPHYXIA.—Suspension of respiration and animation; suffocation, as in drowning or from breathing poisonous gases.

ASTRINGENT.—An agent that arrests bodily discharges by shrinking mucus membranes.

AUTOCLAVE.—An apparatus for sterilization by steam under pressure.

BACILLUS.—A rod-shaped microorganism.

BACTERIA.—Microscopic vegetable organisms of many varieties, some of which produce disease.

BILL OF HEALTH.—A document which must be obtained by the master of a vessel from a consul before his vessel may sail; a health clearance.

BLEB.—A blister.

BUBONIC.—Relating in any way to a bubo. Bubonic plague, the most common form of the plague, characterized by the occurrence of buboes in the groin or armpit.

CAPILLARIES.—The smallest blood vessels of the body which connect the veins and arteries.

CARRIER.—A person who harbors in his body disease-producing germs without actually suffering from or showing symptoms of the disease.

CATHARTIC.—An agent causing active movements of the bowels.

CATHETER.—A slender tubular instrument, generally of soft rubber or of silver, used chiefly for passing through urethra into bladder to draw off the urine.

CAUTERIZE.—To burn or scar with caustics or a hot iron.

CHEMICAL AGENT.—A war gas.

CHOLAGOGUE.—Causing increased evacuation of bile.

CLEANING.—Removal by scrubbing and washing of material contaminated by disease-producing germs.

CLINICAL.—Relating to the course of a disease. Clinical thermometer, a self-registering thermometer for taking the bodily temperature.

COMMUNICABLE.—As of disease, capable of being passed from one individual to another. Commonly referred to as "contagious," if readily communicable, as by the air; "infectious," if not readily communicable, as by contact, water, food, etc.

CONTACT.—Any person or animal who has been sufficiently close to an infected individual to contract the disease.

CONTAGION.—The communication of disease from person to person by contact, direct or indirect.

CORYZA.—Acute rhinitis; cold in the head.

DECONTAMINATION.—Removing and neutralizing a war gas from body, clothing, equipment, food, water or compartment.

DEJECTA.—The matter passed from the bowel; feces.

DELIRIUM.—A temporary mental derangement, occurring in fevers, etc., characterized by incoherent and wandering talk, illusions, etc.

DELOUSING.—The killing of lice or their eggs on the person or clothing of an individual.

DEODORANT.—A substance which destroys or hides foul odors.

DIAPHORETIC.—A medicine that increases perspiration.

DISINFECTANT.—A substance used to destroy the germs of infectious and contagious diseases.

DISINFECTION.—The act or process of disinfecting; purification from infecting matter.

DISLOCATION.—Where the bones forming a joint do not occupy their usual relation to each other.

EMETIC.—An agent which causes vomiting.

ENDEMIC.—A disease constantly present in a community, as distinguished from epidemic.

ENEMA.—A fluid injected into the rectum for the purpose of clearing out the bowel, or of administering drugs or food.

EPIDEMIC.—The extensive prevalence in a community of a disease brought from without, or a temporary increase in number of cases of an endemic disease.

EPIDIDYMITIS.—Inflammation of the seminal ducts of the testicle.

ERUPTION.—A breaking out, especially the appearance of changes in the skin; rash.

EXPECTORANT.—A medicine that promotes expectoration.

FEBRIFUGE.—Medicine which lessens fever.

FECES.—The matter discharged from the bowels during defecation.

FRACTURE.—A break, usually of a bone.

FUMIGATION.—The destruction of germs, insects, and rodents by means of chemical gases and fumes, as that of formaldehyde and sulfur.

FUNGUS.—A cellular vegetable organism of low order, feeding on organic matter; such as mushrooms, toadstools, yeasts, and molds.

GERM.—A microbe or pathogenic bacillus.

GERMICIDE.—An agent which is destructive to germs and microbes.

HEMOSTATIC.—An agent which stops the flow of blood, especially internal.

HERNIA.—Rupture. The protrusion of tissue through an abnormal opening. Most common is "inguinal," the protrusion of a loop of gut through an opening in the belly wall at the groin.

HYPNOTIC.—A drug that induces sleep.

IMMOBILIZATION.—The act of rendering a part immovable or of preventing all possibility of movement in a part; especially applied to fractured bones.

IMMUNITY.—Security against any particular disease; "active," when resulting from an attack of the disease, or from "vaccination"; "passive," when produced by injection of serum of an immunized animal. The former is prolonged, the latter temporary.

INCUBATION PERIOD.—The period between exposure of an individual to and the onset of symptoms of a communicable disease.

INFECTION.—Communication of disease, as by entrance of pathogenic germs into an organism in any manner.

INSECTICIDE.—An agent which kills insects.

ISOLATION.—Limitation of the movement of known sick or "carrier" individuals or animals.

LAXATIVE.—A remedy which assists the movement of the bowels which move sluggishly. A laxative is useless where the bowels have been clogged for several days, in which case a cathartic is necessary.

LIGATURE.—A thread for tying a blood vessel.

MACERATION.—Softening by the action of a liquid.

MACULE.—A discolored spot on the skin not elevated above the surface.

METABOLISM.—Tissue change; consists of "anabolism" (building up), and "catabolism" (breaking down of tissues). It is the process of nourishing the tissue cells, and their production of heat and energy.

MICROBE.—A microscopic organism, especially a bacterium.

MICROORGANISM.—A microscopic living organism of the animal or vegetable kingdom, bacillus, bacterium, microbe, germ.

ORCHITIS.—Inflammation of the testicle; a common complication of mumps.

ORGANIC.—Having an organized structure, or a substance derived from living organisms.

PALPITATION.—Rapid and perceptible beating of the heart, which may be regular or irregular.

PARASITICIDE.—A chemical agent which destroys the various animal and vegetable parasites.

PATHOGENIC.—Productive of disease.

PLEURA.—A thin membrane which lines the inside of the chest wall and covers the lungs.

PNEUMONIC.—Relating to pneumonia. Pneumonic plague, a particularly fatal form of plague, with marked lung involvement.

PRATIQUE.—A license or permission granted by the authorities of a port to the master of a vessel, especially after sanitary inspection or quarantine, to hold com munication with the shore.

PROPHYLAXIS.—The prevention of disease.

PROTOZOA.—The lowest division of the animal kingdom, including the unicellular organisms, such as the malarial parasite.

PURGATIVE, PURGE.—A medicine that moves the bowels actively.

PURULENT.—Consisting of pus, or matter.

PUS.—The matter from a sore or abscess.

PUSTULE.—A small circumscribed inflamed elevation on the skin, containing pus.

QUARANTINE.—Limitation of movements of persons exposed to communicable disease, or of those who have been in contact with persons ill with such disease.

RABIES.—A disease affecting certain animals, especially dogs, from which hydrophobia is communicated to man.

RASH.—An eruption on the skin.

RECTUM.—The lowest part of the large intestine, opening at the anus.

RENOVATION.—Rendering a space or room sanitary, in addition to cleaning, as by painting.

RHINITIS.—Inflammation of the mucus membrane of the nose.

SANITATION.—Employment of measures designed to promote health and prevent disease through proper care of surroundings and things.

SEDATIVE.—A medicine which allays irritation and quiets the nerves.

SEPTIC.—Produced by or due to putrefaction.

SHOCK.—A condition of collapse or profound prostration sometimes following hemorrhage, injury, anesthetic, and operation.

SOPORIFIC.—A hypnotic.

SPATULA.—A broad-bladed instrument like a knife with blunt edges for spreading ointments.

SPECIFIC.—A medicine which has a direct curative influence on a particular disease; as quinine in malaria.

STAPHYLOCOCCUS.—A bead-shaped microorganism occurring in clumps.

STERILE.—Free from pathogenic bacteria or other microorganisms; aseptic.

STIMULANT.—A medicine having power to excite organic action or to increase the vital activity of an organ, as heart stimulant, respiratory stimulant.

STREPTOCOCCUS.—A bead-shaped microorganism occurring in chains.

STRICTURE.—A narrowing of a passage or canal in the body due to disease or injury.

STYPTIC.—Medicine or application to control external hemorrhage.

SUSCEPTIBLE.—A person or animal who is not immune to a specific disease.

SUTURE.—A stitch used to draw together the edges of a wound.

TONIC.—An agent which tends to restore normal tone to the body.

TOURNIQUET.—An instrument for stopping the flow of blood through an artery by means of strong compression.

TOXIN.—A poisonous substance of undetermined chemical nature, elaborated during the growth of pathogenic microorganisms.

URETHRA.—The canal by which the urine is conducted from the bladder and discharged.

URINATION.—The act of discharging the contents of the bladder.

UVULA.—The small, fleshy body which hangs from the soft palate over the root of the tongue.

VARICOSE.—Having an unnatural enlargement or dilation, knotty and irregular in shape, as often seen in the veins of the lower extremities.

VENEREAL.—Pertaining to sexual intercourse or caused by it.

VERMICIDE.—A medicine which causes the death and expulsion of intestinal worms.

VIRUS, FILTRABLE.—The causative agent of some diseases, differentiated from other agents such as bacteria, protozoa, or molds; is ultramicroscopic, and passes through the finest filters. The cause of smallpox, yellow fever, and many other diseases.

INDEX

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